

# Traffic Safety Problem Identification

FY 2001

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## **A. INTRODUCTION**

This document is produced in order to identify and analyze trends and problem areas related to traffic safety in Montana. The information contained within this publication originates primarily from traffic crashes occurring on public roadways. Crashes must involve at least one motor vehicle upon these roadways. Many contributing factors are discussed within this analysis. The demographics of the resultant injuries and fatalities along with the drivers and vehicles involved are shown. The analysis is intended to provide traffic safety specialists with the information required to assist in the design of countermeasures and to monitor progress.

Data is first presented on general exposure and demographics. Information is then presented in specific traffic areas and items of interest such as alcohol-involved crashes, restraint usage, crashes involving trucks, motorcycles, bicycles and pedestrians. Current year data are compared to the previous year and the average of the previous five years. Most tables contain ten years of data. The last two lines of the table contain the percentage change for these aforementioned comparisons.

The crash record system includes all motor vehicle crashes that occur on public roadways that are submitted to the Montana Highway Patrol by investigating officers. A crash report is to be completed for any crash resulting in death, injury, or property damage amounting to \$1000 or more. These incidents are termed reportable crashes. Many crashes such as single vehicle run off the road, wild animal crashes and minor fender benders are not reported even when there is more than \$1000 of damage. The reporting level changed from \$400 to \$1000 on January 1, 2000. This may affect some comparisons, which look at total crash numbers.

The reporting by local law enforcement jurisdictions is voluntary. Their reporting is relatively complete. In addition, a few non-reportable crash reports are received by the Highway Patrol. These are kept on file, but the data is not entered into the crash records system. The data elements within the crash record system include information on vehicles, roadway, drivers, passengers, pedestrians, bicyclists, and crash details.



## B. TRAFFIC CRASH AND EXPOSURE STATISTICS

The crash statistics in this publication relate to traffic crashes occurring within Montana. The statistics include information on all people involved in the crash regardless of residency.

Traffic crash and injury counts generally increased during the first seven years of the 1990's, but have tended to decrease somewhat during the last three years. Ten years of reportable crash and injury data appear in Table 1. Fatalities were lower in 1999 than either of the two previous years. Injury crashes and persons injured were both somewhat higher than in 1998.

Table 1 Crashes by Severity						
Year	All Crashes	Fatal Crashes	Injury Crashes	Property Damage Crashes	Fatalities	Injuries
1990	16445	190	5520	10735	212	8220
1991	17058	172	5514	11355	200	8449
1992	17310	170	5903	11237	191	8999
1993	18839	166	6144	12529	194	9288
1994	19351	182	6568	12601	202	9903
1995	20508	186	6807	13515	216	10255
1996	24882	177	6980	17665	198	10557
1997	22619	223	6951	15445	265	10688
1998	22068	208	6728	15132	237	10075
1999	21078	194	6769	14113	220	10459
Chg 1 Yr	-4.5%	-6.7%	+0.6%	-6.7%	-7.2%	+3.8%
Chg 5 Yr	-3.7%	-0.6%	-0.6%	-5.1%	-1.6%	+1.6%

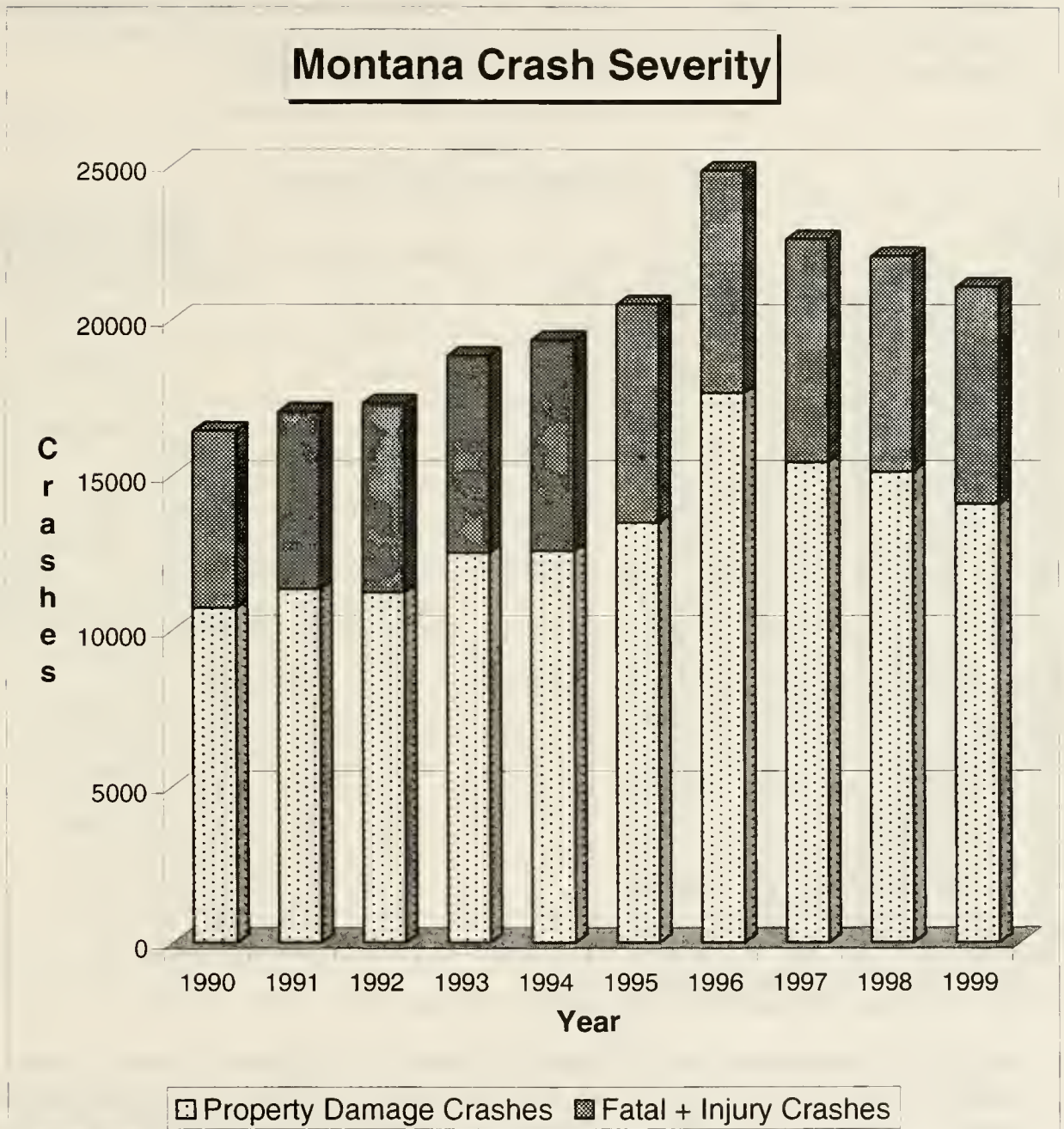
Source: Traffic Information System (TIS) – Montana Department of Transportation

Figure 1 on the following page is a graphic representation of crashes by severity type. Property damage crashes vary greatly from year to year. Much of this variation results from differences in the amount of icy road conditions, especially in urban areas. Property damage crashes were elevated in 1996, because the winter driving was significantly worse than during an average winter.

Injury and severe injury crash counts tend to be more accurate indicators of safety trends in Montana. These crashes better represent change without the variations caused by icy roads. Severe injury crashes are those crashes involving a fatality or an incapacitating injury.



Figure 1



There are many variables that can be considered as exposure statistics for the area of traffic safety. These would include number and type of vehicles, number of licensed drivers by age and gender, physical road miles, and the number of vehicle miles driven. Table 2 displays Vehicle Miles Traveled (VMT), which is the estimated number of total miles driven by all vehicles on Montana public roads, licensed drivers and registered motor vehicles. VMT is the exposure number that appears to have the greatest influence on the amount of traffic crashes that occur in Montana.

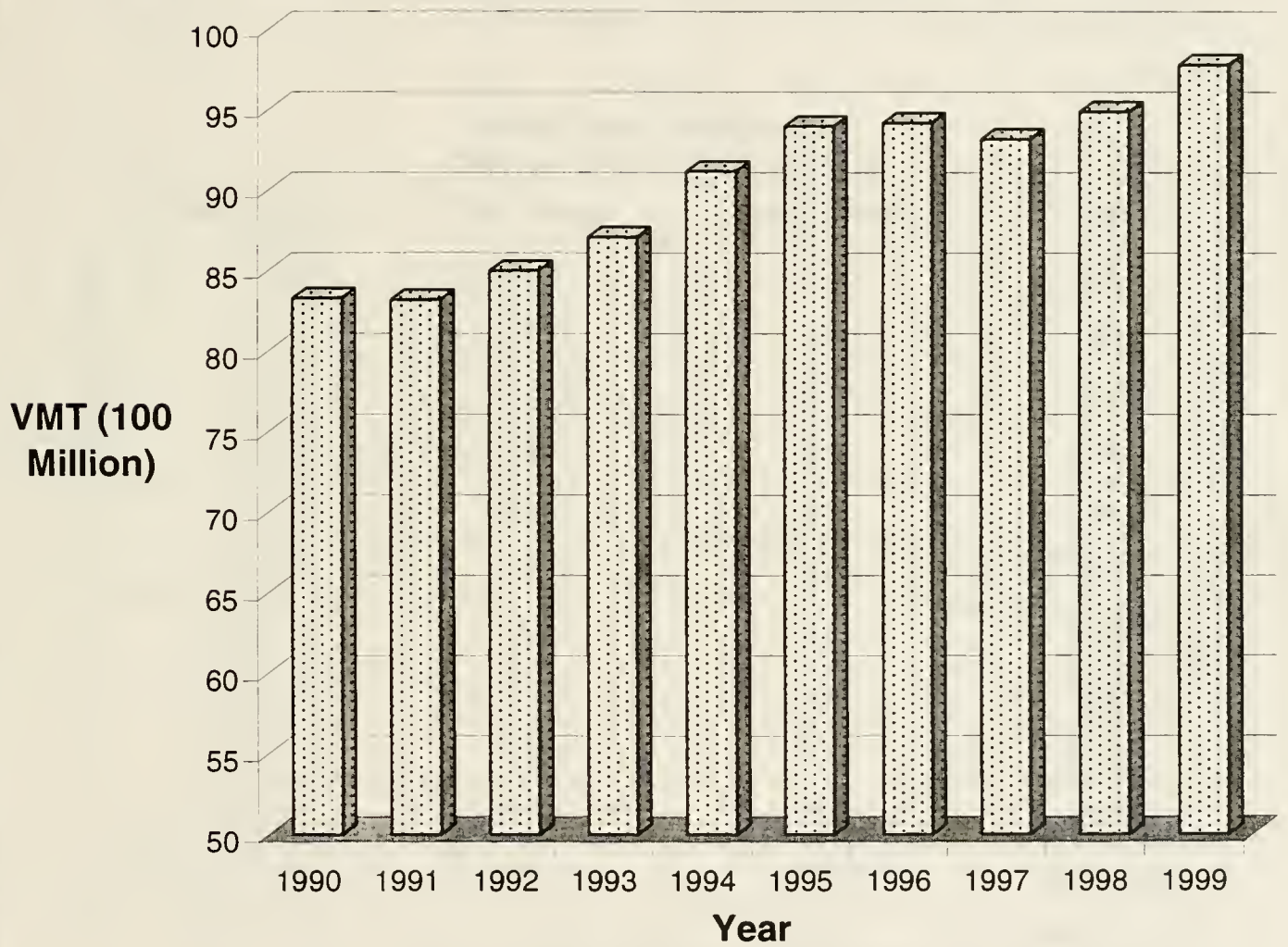
<p>Table 2 Crash Exposure By Factors</p>			
Year	VMT (100 Million Miles)	Licensed Drivers	Registered Motor Vehicles (plus trailers)
1990	83.3	NA	865,196
1991	83.2	NA	880,800
1992	85.0	NA	916,534
1993	87.1	NA	961,745
1994	91.1	NA	984,946
1995	94.0	573,749	1,003,605
1996	94.2	NA	1,010,506
1997	93.2	NA	1,028,570
1998	94.9	646,512	1,042,183
1999	97.8	NA	NA
Chg 1 Year	+3.1%	---	---
Chg 5 Year	+4.6%	---	---

Source: VMT – Montana Department of Transportation  
 Licenses and Registered Vehicles – Department of Justice

The annual vehicle miles traveled values are shown on the following chart. These numbers took a jump upward in 1999 after having changed little over the previous four years. During 1970, the VMT for Montana was 4.8 billion. Now in 1999, this figure is more than double at 9.8 billion.

Figure 2

## Vehicle Miles Traveled





The fatality rate for Montana was 7.64 fatalities per hundred million miles traveled in 1969. This rate has been generally decreasing since then. It had decreased to 4.92 in 1980. By 1996, this rate reached an all time low at 2.10. In 1997, the rate increased substantially to 2.84. Much of this increase was likely due to the rescinding of the national speed limit along with a one-year jump in alcohol-related fatalities. The 1998 rate dropped down to 2.50 and during 1999, the fatality rate dropped further to 2.25. During the last seven months of 1999, Montana again had a numerical speed limit. This may have had an impact, but it is too early to evaluate the effect of a limit.

The injury rate increased slightly to 106.9 and has been showing a trend over the last ten years. The crash rate was 215.4, down from 263.5 in 1996. This rate is similar to the levels experienced in Montana during the early 1990's.

<p>Table 3</p> <p><b>Statewide Crash Rates</b></p> <p><b>(Per 100 Million Miles Traveled)</b></p>			
Year	Fatality Rate	Injury Rate	Crash Rate
1990	2.54	99.0	197.5
1991	2.41	101.7	205.1
1992	2.25	105.7	203.1
1993	2.23	106.7	216.4
1994	2.22	108.6	212.3
1995	2.29	109.1	218.2
1996	2.10	112.1	263.5
1997	2.84	114.7	242.6
1998	2.50	106.1	232.5
1999	2.25	106.9	215.4
Chg 1 Year	-10.0%	+0.8%	-7.4%
Chg 5 Year	-5.9%	-2.9%	-7.9%

Source: TIS and Traffic Data Collection - Montana Department of Transportation

Figure 3 compares the national fatality rate with the Montana rate. Historically, western rural states have tended to have rates that are above the national average.

Figure 3



Table 4 displays the distribution of injury severity to persons involved in motor vehicle crashes in Montana for the last ten years. This table is examining injury severity in order to determine whether restraint use and airbags are having an impact.

<p>Table 4</p> <p><b>Injury Severity</b></p> <p>(persons)</p>						
Year	Fatalities	Inca- pacitating	Non Inca- pacitating	Possible Injury	No Injury	Total Passengers
1990	212	2,199	2,585	3,496	20,165	28,657
1991	200	2,163	2,638	3,654	25,288	33,943
1992	191	2,232	2,856	3,911	31,974	41,164
1993	194	2,261	2,835	4,192	36,374	45,856
1994	202	2,474	2,970	4,459	37,193	47,298
1995	216	2,405	3,099	4,751	38,911	49,381
1996	198	2,043	3,057	5,457	46,378	57,133
1997	265	1,917	3,187	5,584	42,664	53,617
1998	237	1,872	3,116	5,342	40,847	51,414
1999	220	1,739	3,254	5,759	38,014	48,986
Chg 1 Yr	-7.2%	-7.1%	+4.4%	+7.8%	-6.9%	-4.7%
Chg 5 Yr	-1.6%	-18.8%	+5.5%	+12.5%	-7.7%	-5.4%

Source: TIS - Montana Department of Transportation

Fatalities were down 7.2% in 1999 after a large increase in 1997. Incapacitating injuries decreased for the fifth straight year. This decrease is very nearly 30% since 1994. Severe injuries (fatalities plus incapacitating injuries) tend to be very costly in economic loss. Figure 4 on the following page shows clearly this history of injuries over time. This decrease in severe injuries could be the result of better seat belt use, air bags, improved emergency medical services and more forgiving roadways.

Figure 4

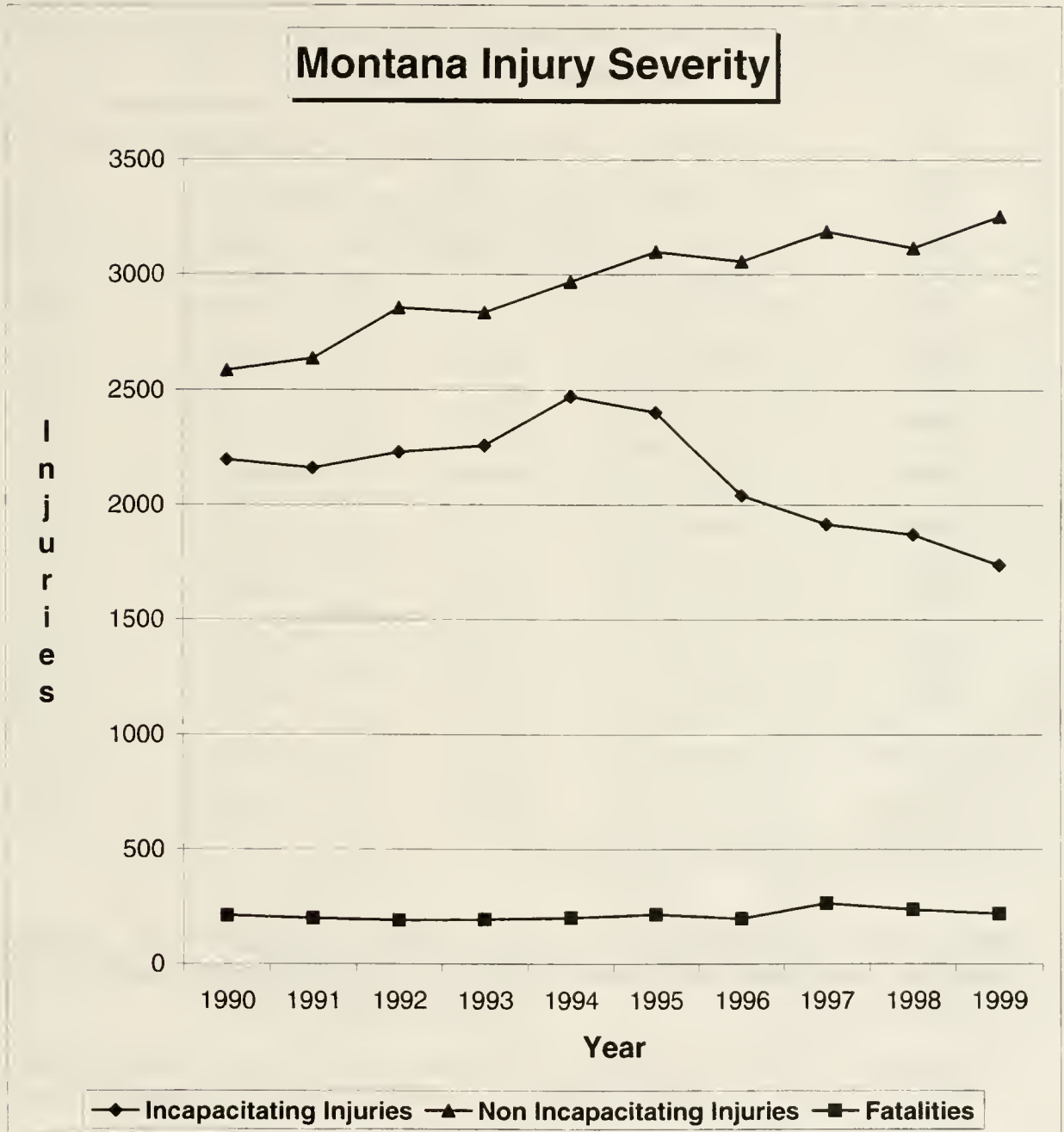


Table 5 includes a comparison of crashes by rural or urban location. The percentage of urban crashes has decreased significantly during the past five years. This change may be caused by higher rural speeds along with mild winter weather conditions. The 1998-1999 winter in Montana was mild. The 1999-2000 winter was very mild. These winters have resulted in a very low amount of driving in icy conditions.

<p style="text-align: center;">Table 5 <b>Urban vs. Rural Crashes</b></p>				
Year	All Crashes	Rural Crashes	Urban Crashes	Percent Urban
1990	16,445	7,693	8,752	53.2%
1991	17,058	7,969	9,089	53.3%
1992	17,310	7,985	9,325	53.9%
1993	18,839	8,427	10,412	55.3%
1994	19,351	9,190	10,161	52.5%
1995	20,508	9,846	10,662	52.0%
1996	24,822	11,812	13,010	52.4%
1997	22,619	10,921	11,626	51.4%
1998	22,068	10,976	11,007	49.9%
1999	21,078	11,241	9,837	46.7%
Chg 1 Year	-4.5%	+2.4%	-10.6%	-6.4%
Chg 5 Year	-3.7%	+6.6%	-12.9%	-9.6%

Source: TIS - Montana Department of Transportation

Urban crashes as a percentage of all crashes reached a new low in 1999. The lowest percentage value before this occurred in 1981 at 47.4%. The highest percentage of 55.3% occurred in 1993.



Economic loss from motor vehicle crashes is shown for recent years in Table 6. The Montana Highway Patrol calculates these losses using estimates for average crashes, injuries and fatalities, which are provided by the National Safety Council. These estimates cover wage loss, medical expense, insurance administration and property damage costs. Indirect costs for human suffering and loss are more difficult to quantify and are not included as part of this estimate.

<p>Table 6</p> <p><b>Economic Loss in Crashes</b></p> <p>(Millions of Dollars)</p>	
Year	Economic Loss
1990	\$190
1991	\$238
1992	\$249
1993	\$220
1994	\$235
1995	\$479*
1996	\$476
1997	\$509
1998	\$591
1999	\$677
Change 1 Year	+14.6%
Change 5 Year	---

\* Changed method of loss calculation  
Source: Montana Highway Patrol

It is evident that the trend in average cost has risen in these ten years. Clearly, since the costs are large and increasing, there is a significant impact on the state economy.

Table 7 shows vehicle miles traveled for 1999 (VMT) and crash and injury rates based on VMT for each county. VMT was obtained for on-system roads in Montana from Traffic Data Collection Section of Montana Department of Transportation. The VMT for Montana off-system roadways was estimated by prorating the remaining mileage on a population basis. This estimate is then added to the MDT on-system value for each county. This final county estimate, although reasonable, is merely a rough estimate. Counties are grouped according to population size within the table. An 'x' is shown at right for counties that are 10% above the group average for either of the two rates.

**Table 7**  
**Injury Rates by County – 1999**

County	Population (1999 Est)	Vehicle Miles (1999) (millions)	Crashes	Crash Rate (per million)	Injuries	Injury Rate (per million)	
<b>Population greater than 20,000</b>							
Yellowstone	127,258	783.5	1850	2.36	1092	1.39	
Missoula	89,344	785.3	2290	2.92	1125	1.43	
Cascade	78,282	544.3	2361	4.34	802	1.47	X
Flathead	72,773	763.9	1796	2.35	1048	1.37	
Gallatin	63,881	700.4	1801	2.57	658	0.94	
Lewis & Clark	54,075	422.1	1717	4.07	808	1.91	X
Ravalli	35,811	357.1	827	2.32	311	0.87	
Silver Bow	33,954	251.4	801	3.19	296	1.18	X
Lake	25,885	344.3	534	1.55	381	1.11	
Total/Ave		4952.3	13977	2.82	6521	1.32	
<b>Population 10,000 – 19,999</b>							
Lincoln	18,819	208.8	356	1.71	216	1.03	
Hill	17,050	138.9	417	3.00	134	0.96	X
Park	15,982	250.1	467	1.87	226	0.90	X
Glacier	12,603	154.6	229	1.48	196	1.27	X
Big Horn	12,573	261.0	179	0.69	140	0.54	
Fergus	12,180	134.6	293	2.18	94	0.70	X
Custer	11,837	125.7	307	2.44	108	0.86	X
Roosevelt	10,912	122.6	149	1.22	65	0.53	
Jefferson	10,367	249.9	329	1.32	180	0.72	
Sanders	10,233	147.6	210	1.42	134	0.91	
Richland	10,053	100.8	200	1.98	77	0.76	X
Total/Ave		1894.6	3136	1.66	1570	0.83	

Table 7 (continued)  
**Injury Rates by County – 1999**

County	Population (1999 Est)	Vehicle Miles (1999) (millions)	Crashes	Crash Rate (per million)	Injuries	Injury Rate (per million)	
<b>Population 5,000-9,999</b>							
Rosebud	9,869	144.2	129	0.89	62	0.43	
Deer Lodge	9,721	114.0	140	1.23	77	0.68	X
Carbon	9,543	147.8	243	1.64	108	0.73	X
Beaverhead	8,790	167.4	224	1.34	88	0.53	
Dawson	8,670	131.8	228	1.73	80	0.61	X
Stillwater	8,328	171.7	238	1.39	124	0.72	X
Valley	8,132	95.4	134	1.40	49	0.51	X
Blaine	7,074	93.2	106	1.14	45	0.48	
Powell	6,945	187.1	198	1.06	92	0.49	
Madison	6,927	128.8	143	1.11	95	0.74	X
Teton	6,432	89.0	94	1.50	41	0.62	X
Pondera	6,244	88.0	134	1.07	55	0.47	
Chouteau	5,066	88.9	74	0.83	44	0.49	
Total/Ave		1647.3	2085	1.27	960	0.58	
<b>Population less than 5,000</b>							
Phillips	4,692	64.5	64	0.99	41	0.64	X
Toole	4,638	90.1	118	1.31	53	0.59	
Musselshell	4,552	65.3	125	1.91	62	0.95	X
Broadwater	4,167	108.6	141	1.29	84	0.77	X
Sheridan	4,100	49.1	73	1.49	24	0.49	X
Mineral	3,867	196.9	276	1.40	109	0.55	X
Sweet Grass	3,584	128.8	129	1.00	66	0.51	
Fallon	2,885	35.7	27	0.76	18	0.50	
Granite	2,662	106.9	102	0.95	38	0.36	
Judith Basin	2,284	65.6	81	1.23	44	0.67	X
Wheatland	2,276	40.6	68	1.67	33	0.81	X
Liberty	2,253	28.8	20	0.69	9	0.31	
Daniels	1,963	22.7	27	1.19	5	0.22	
McCone	1,924	33.3	33	0.99	12	0.36	
Powder Rvr	1,777	37.2	40	1.07	19	0.51	
Meagher	1,777	33.0	44	1.33	34	1.03	X
Carter	1,454	24.4	11	0.45	8	0.33	
Garfield	1,420	25.9	18	0.70	17	0.66	X
Prairie	1,360	34.8	36	1.03	9	0.26	
Wibaux	1,117	27.7	32	1.16	14	0.51	
Golden Vally	1,049	26.5	28	1.06	9	0.34	
Treasure	859	36.6	53	1.72	16	0.52	X
Petroleum	506	12.0	24	1.99	13	1.08	X
Total/Ave		1295.0	1570	1.21	737	0.57	



## C. CRASH DEMOGRAPHICS

### 1. Gender of Drivers

Male drivers are more likely to be involved in crashes than females, when prorated by the number of licensed drivers. However, when based upon average national vehicle miles driven by gender, this difference in crash rates largely disappears. No state statistics on miles traveled by gender are available. National estimates by gender are the only available information. These estimates show that male drivers account for over 60% of the miles traveled.

Driver involvement in crashes by gender is shown in table 8. While male involvement is 60.7% of all crashes, involvement by females has been increasing consistently over the past 20 years. During the last two years, this trend may be changing.

Table 8 Crashes by Driver Gender					
Year	Drivers in Crashes			Percent of Total	
	Female	Male	Total	Female	Male
1990	9,681	15,829	25,510	37.9%	62.1%
1991	9,949	16,575	26,524	37.5%	62.5%
1992	10,382	16,757	27,139	38.3%	61.7%
1993	11,567	18,523	30,090	38.4%	61.6%
1994	11,745	18,661	30,415	38.6%	61.4%
1995	12,420	19,687	32,110	38.7%	61.3%
1996	14,932	23,326	38,258	39.0%	61.0%
1997	13,943	20,915	34,858	40.0%	60.0%
1998	12,818	19,382	32,200	39.8%	60.2%
1999	12,248	18,904	31,152	39.3%	60.7%
Chg 1 Year	-4.4%	-2.5%	-3.3%	-1.3%	+0.8%
Chg 5 Year	-7.0%	-7.3%	-7.2%	+0.2%	-0.1%



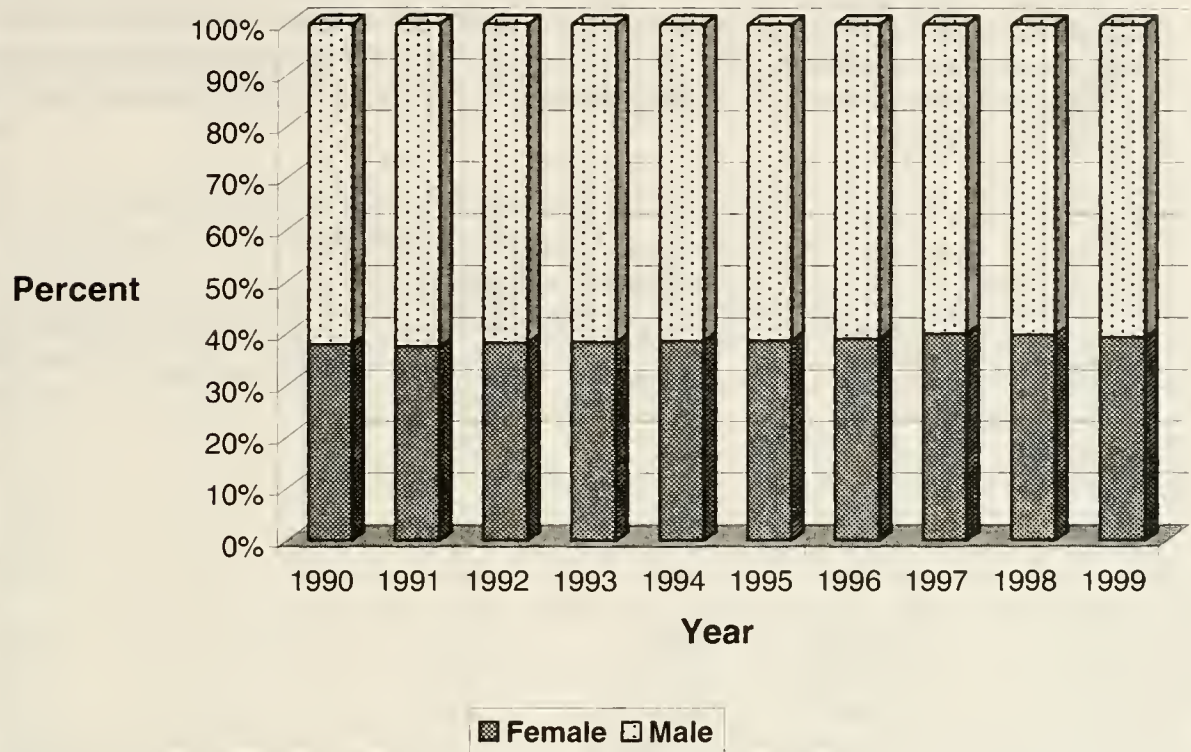
Men have a disproportionate involvement in fatal crashes. Past studies have shown that men have higher involvement in overturns, other non-collision crashes, crashes into fixed objects and the striking of animals. Much of this is due to men's much higher involvement in alcohol-related crashes. Table 9 follows with information on fatal crashes and figure 5 on the following page summarizes this gender data.

<p>Table 9</p> <p><b>Fatal Crashes by Driver Gender</b></p>					
Year	Drivers in Fatal Crashes			Percent of Total	
	Female	Male	Total	Female	Male
1990	68	187	255	26.7%	73.3%
1991	43	185	228	18.9%	81.1%
1992	54	167	221	24.4%	75.6%
1993	55	163	218	25.2%	74.8%
1994	76	173	249	30.5%	69.5%
1995	52	202	254	20.5%	79.5%
1996	71	177	248	28.6%	71.4%
1997	74	218	292	25.3%	74.7%
1998	68	213	281	24.2%	75.8%
1999	78	187	265	29.4%	70.6%
Chg 1 Year	+14.7%	-12.2%	-5.7%	+21.5%	-6.9%
Chg 5 Year	+14.4%	-4.9%	+0.1%	+13.9%	-4.8%

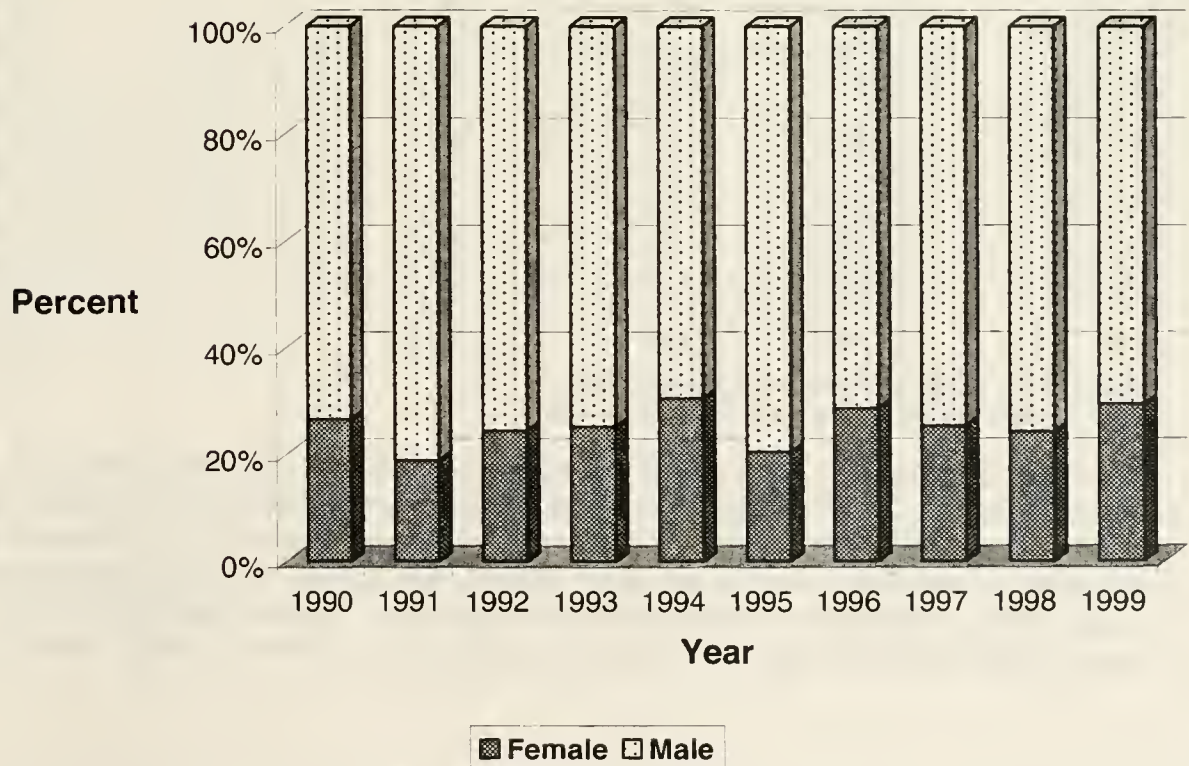
Source: TIS – Montana Department of Transportation

Figure 5

### Driver Gender in Crashes



### Driver Gender in Fatal Crashes



## **2. Age of Drivers**

It has been shown in national studies that the likelihood of being involved in a traffic crash varies with driver age. The actual rates in Montana can help traffic safety groups make decisions on targeting specific age groups. Table 10 contains data related to age of driver in crashes.

Table 10 <b>Crashes by Age of Driver</b> (1999 Crash Data)					
Age	Licensed Drivers (1998)	Drivers in Crashes	Crashes per 1000 Licenses	Drivers in Fatal Crashes	Fatal Crashes per 1000 Licenses
Under 16	5,672	997	176	8	1.41
16	9,830	1248	127	8	0.81
17	11,491	1412	123	4	0.35
18	12,380	1292	104	11	0.89
19	11,886	1181	99	16	1.35
20	11,804	934	79	8	0.68
Under 21	63,063	7064	112	55	0.87
21-24	42,757	2848	67	21	0.49
25-29	52,305	2519	48	22	0.42
30-39	118,951	5036	42	48	0.40
40-49	140,906	5015	36	46	0.33
50-59	97,809	2976	30	26	0.27
60-69	65,470	1708	26	16	0.24
70+	65,246	1859	28	24	0.37

Source: TIS – Montana Department of Transportation  
Motor Vehicle Division – Department of Justice

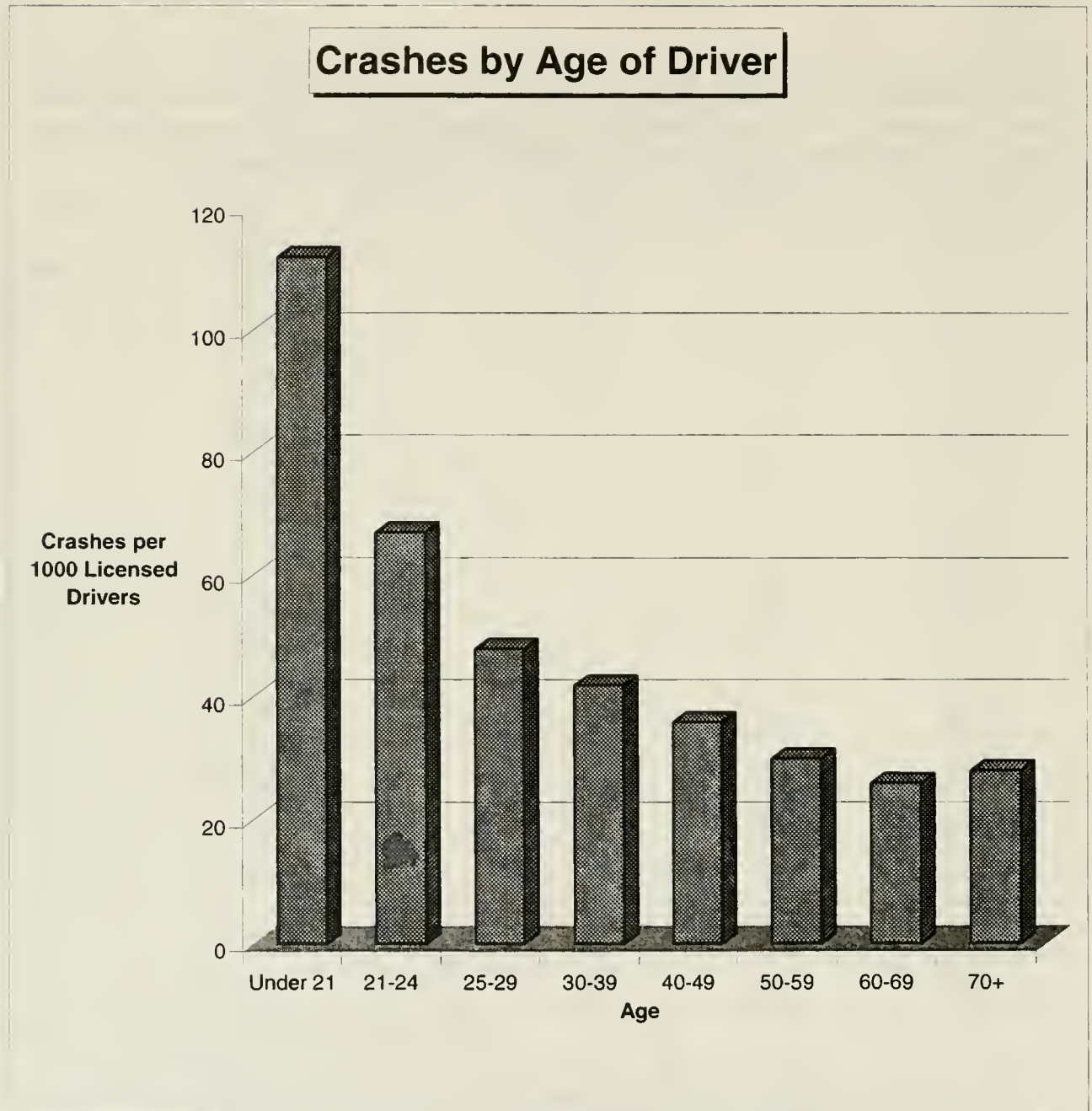
Young drivers are over-represented in traffic crashes based upon the number of licensed drivers. Nationally the number of miles driven by teens is less than for drivers of all ages. In fact teens drive 35% fewer miles than average adults. If Montana teens are similar, then their rate of crashes per vehicle miles driven would be even more extreme than the rate that is shown per licensed driver. Drivers between 15 and 20 years of age were involved in 112 crashes per thousand drivers in 1999. Every other



age group over 20 years of age had less than 67 crashes per thousand licensed drivers. Each higher age group had fewer crashes per licensed driver than the previous age group, with the exception of the over 70 group. It could be suggested that experience and/or risk taking are factors in this difference by age. Certainly the change for each year of age between 15 and 20 supports the supposition that experience is a strong factor.

Similarly, the fatal crash rate is lower for older drivers. Drivers under 21 were involved in .87 fatalities per thousand licensed drivers, while all age groups between 25 and 69 were involved in .49 or less fatalities per thousand drivers. The following chart shown on figure 6 shows this change in crash incidence by age of driver.

Figure 6



The following table shows the percentage of elderly drivers and young drivers in crashes. The data goes back to 1983 in order to show long term trends.

<p>Table 11</p> <p><b>Drivers in Crashes</b></p> <p><b>Elderly and Youthful</b></p>					
	Percent of Drivers In Crashes Under Age		Percent of Drivers in Crashes of this Age or Older		
Year	18	21	55	65	75
1983	10.3%	24.8%	13.0%	6.5%	2.3%
1984	10.5%	23.8%	13.2%	6.8%	2.3%
1985	10.8%	22.9%	13.7%	7.1%	2.5%
1986	12.1%	23.8%	14.7%	7.8%	2.9%
1987	12.9%	24.8%	15.2%	8.2%	3.0%
1988	11.9%	23.7%	15.2%	8.6%	3.1%
1989	10.9%	22.9%	14.4%	7.9%	2.9%
1990	11.8%	23.7%	15.5%	8.8%	3.4%
1991	11.5%	22.4%	15.5%	8.9%	3.5%
1992	12.1%	23.3%	15.6%	9.0%	3.6%
1993	11.7%	22.8%	15.2%	8.5%	3.6%
1994	12.3%	23.2%	15.5%	9.0%	3.9%
1995	12.7%	23.9%	15.4%	8.9%	3.6%
1996	11.1%	22.0%	15.5%	8.7%	3.5%
1997	12.0%	23.0%	16.1%	9.0%	4.0%
1998	11.9%	23.3%	16.3%	9.0%	3.9%
1999	12.6%	24.3%	16.6%	9.1%	4.1%
Chg 1 Year	+5.9%	+4.3%	+1.8%	+1.1%	+5.1%
Chg 5 Year	+5.0%	+5.3%	+5.3%	+2.0%	+8.5%

Source: TIS - Montana Department of Transportation

Young drivers have not had significant changes in their share of crashes during the last 17 years. There has been some increase during the last five years and these small fluctuations for the most part represent changes in the population of this group.

Elderly drivers have experienced large changes during this period, because people are living longer and these drivers make up a larger percentage of licenses in Montana. During 1983, only 2.3% of drivers involved in crashes were 75 and over. This percentage in 1999 was at 4.1%. Similarly, those 65 and over have changed from 6.5% to 9.1%. Those 55 and over have changed from 13.0% to 16.6%.

### 3. Gender of Injuries

Injury involvement by gender is shown below in Table 12. In 1997, females for the first time had more injuries resulting from traffic crashes. While this did not occur in 1998 and 1999, the slow increase in injuries for females can be partially attributed to their increase in vehicle miles traveled. Men still account for 60 to 70% of the fatalities.

Table 12 Injuries by Gender						
Year	Injuries			Fatalities		
	Female	Male	Percent Female	Female	Male	Percent Female
1990	3826	4450	46.2%	76	136	35.8%
1991	3984	4449	47.2%	54	146	27.0%
1992	4259	4755	47.2%	54	137	28.3%
1993	4515	4769	48.6%	73	121	37.6%
1994	4791	5114	48.4%	69	133	34.2%
1995	4961	5288	48.4%	70	145	32.6%
1996	5206	5346	49.3%	69	129	34.8%
1997	5377	5322	50.3%	97	168	36.6%
1998	4634	4871	48.8%	72	165	30.4%
1999	4769	5015	48.7%	73	147	33.2%
Chg 1 Yr	+2.9%	+3.0%	-0.2%	+1.4%	-10.9%	+9.2%
Chg 5 Yr	-4.5%	-3.3%	-0.8%	-3.2%	-0.7%	-1.5%

Source: TIS – Montana Department of Transportation



#### 4. Age of Injuries

Injury involvement by age is shown below. There has been a significant increase of injuries in the age groups 35 and over. This parallels the fact that the baby boom is in these age groups and in addition there are many more senior citizens in the population. At the same time there has been a decrease in the 25-34 age group. The population numbers of that age group are down in recent years. It should be noted that the 15-19 crash numbers are very high, especially when you see that all age groups over 25 include 10 years segment compared to only 5 years for those below.

<p>Table 13 Injuries by Age</p>									
Year	0-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+
1990	854	1865	1132	1613	1145	617	421	313	230
1991	887	1841	1169	1637	1204	630	418	336	233
1992	910	1980	1333	1695	1227	735	414	341	273
1993	907	2018	1279	1755	1340	750	475	391	287
1994	980	2192	1398	1775	1433	873	495	356	316
1995	1016	2365	1364	1739	1530	956	510	391	291
1996	1025	2229	1311	1776	1677	1054	598	466	318
1997	1080	2422	1331	1695	1611	1117	555	447	347
1998	1012	2067	1236	1473	1398	1040	555	407	N/A
1999	1014	2069	1220	1311	1430	1027	524	355	513
Chg 1	+0.2%	+0.1%	-1.3%	-11.0%	+2.3%	-1.2%	-5.6%	-12.8%	---
Chg 5	-0.8%	-8.2%	-8.1%	-22.5%	-6.5%	+1.9%	-3.4%	-14.1%	---

Source: TIS – Montana Department of Transportation

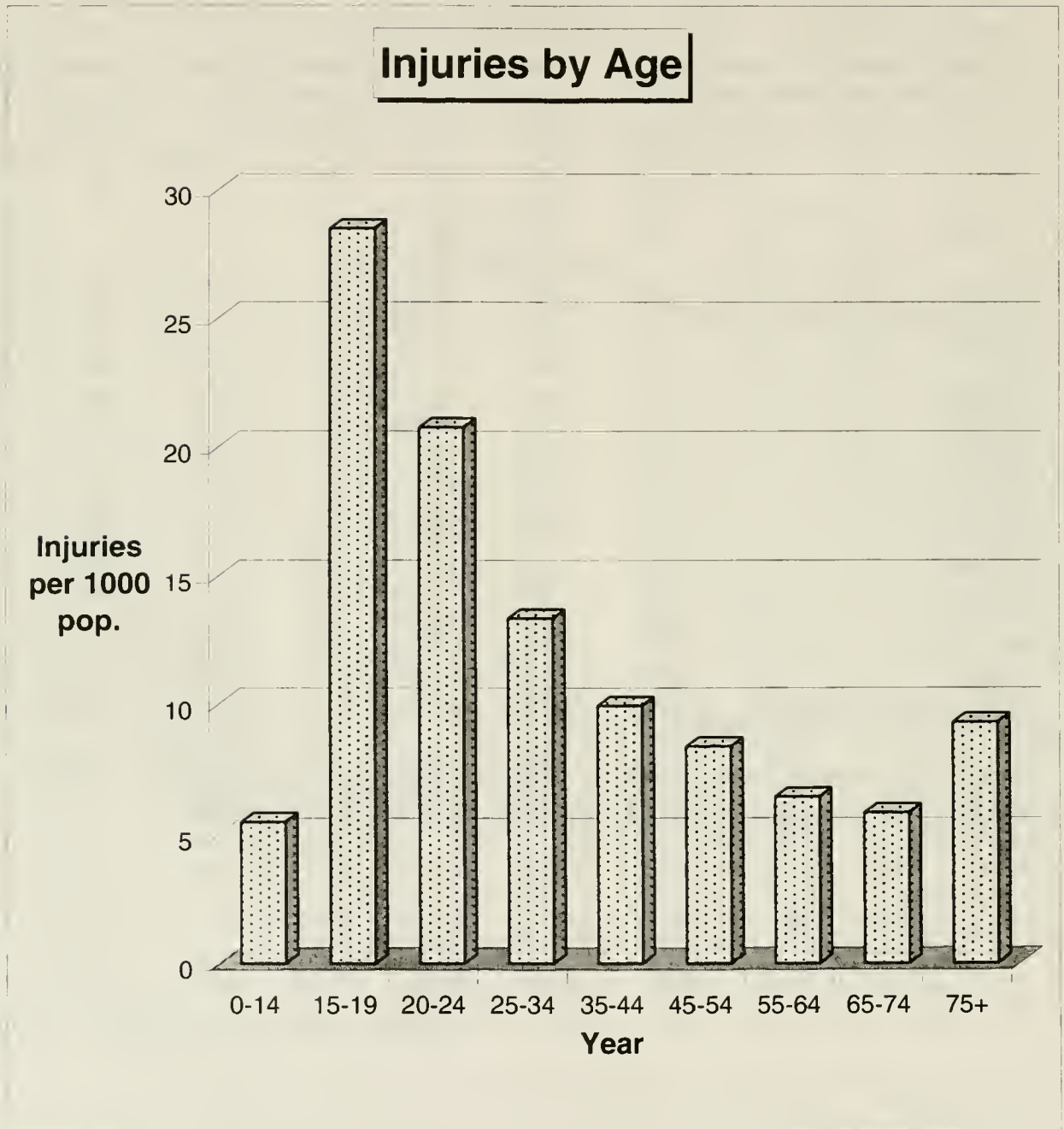
Fatalities by age are presented below. It appears that fatalities for those who are 25-34 are decreasing. At the same time, fatalities are increasing in all age groups over 35. Table 14 presents 10 years of data with the average reported for each age group.

Table 14 Fatalities by Age									
Year	0-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+
1990	12	24	39	47	25	28	13	10	14
1991	7	17	37	44	35	11	18	19	12
1992	13	26	29	48	29	13	12	14	7
1993	2	35	36	38	27	18	14	12	12
1994	16	30	21	40	30	26	9	13	17
1995	18	27	17	36	34	24	22	14	23
1996	12	19	33	29	37	25	13	13	17
1997	13	35	31	38	42	42	20	18	24
1998	10	29	26	32	41	34	18	20	27
1999	11	39	28	30	34	31	19	11	17
Ave	11.4	28.1	29.7	38.2	33.4	25.2	15.8	14.4	17.0

Source: TIS – Montana Department of Transportation

Figure 7 on the following page shows injuries by age per 1000 population. It is quite evident from this chart of the high danger to teens and young adults.

Figure 7





## **D. TRAFFIC SAFETY PUBLIC OPINION SURVEY**

The Traffic Safety Bureau has contracted for a public opinion survey with the Department of Public Health & Human Services since 1984. This survey is an ongoing monthly survey with a sample size of approximately 150 Montana adults per month. A subcontractor performs the surveying using telephone interviews. The survey is part of the Center for Disease Control (CDC) Behavioral Risk Factor Surveillance System (BRFSS). The Traffic Safety Bureau has been allowed to add several traffic safety related questions to this survey. Table 14 on the following two pages contains the results of some of these questions from the 1990 – 1999 surveys.

The continuity of the data allows us to track public sentiment concerning highway safety. Montanans support strong efforts to enforce impaired driving laws. Over 94% of respondents support this effort. Support of the seat belt law continues to be very high. The level of support for a law in 1985 was 42%, while currently the law receives support from 81% of Montanans.

Education on the drinking and driving issue showed positive results during the 1980's, and continues to remain at those levels in the nineties. More than 64% of Montanans know that drinks of wine, beer and whisky all are equally intoxicating. This value was at 35% in 1984. Montanans are also becoming more aware of the legal level of blood alcohol and what it means. Public support for a motorcycle helmet law is above 69%, although those Montanans against the law are very vocal.

Those people perceiving a greater risk of DUI arrest than the previous year is declining. Over 40% perceive an increased risk, but there has been a drop from 65% over the last ten years. It would seem that a perception of continued increased risk could not be maintained forever, so this result is not surprising. Table 15 on the following two pages presents the results of some of the questions in the survey.

Table 15 a Traffic Safety Public Opinion Survey			
Year	Do you support strict law enforcement for DUI?	Which is most intoxicating? Beer, Wine or Whisky	Do you support the mandatory seat belt law?
	Yes	All Same	Yes
1990	97.4%	61.1%	75.5%
1991	96.6%	68.0%	77.1%
1992	96.6%	64.2%	79.2%
1993	96.2%	63.5%	81.4%
1994	95.8%	60.8%	80.8%
1995	96.4%	52.1%	80.9%
1996	96.7%	64.4%	82.5%
1997	95.5%	64.0%	82.4%
1998	95.2%	64.3%	83.4%
1999	94.8%	64.2%	81.2%
Chg 1 Year	-0.4%	-0.2%	-2.6%
Chg 5 Year	-1.2%	+5.0%	-1.0%

Source: Traffic Safety Bureau – Montana Department of Transportation

Table 15 b  
**Traffic Safety Public Opinion Survey**

Year	What is the legal level of Blood Alcohol? (BAC)	Is there more chance of being arrested for DUI than 1 year ago?	Would you support a mandatory helmet law?
	.10	Yes	Yes
1990	36.7%	63.6%	78.8%
1991	40.8%	59.6%	78.9%
1992	43.6%	57.7%	78.1%
1993	36.4%	49.1%	77.7%
1994	40.3%	49.7%	75.8%
1995	39.9%	47.4%	72.8%
1996	41.4%	46.7%	70.9%
1997	37.9%	41.4%	72.6%
1998	37.4%	40.7%	72.2%
1999	35.4%	40.8%	69.8%
Chg 1 Year	-5.3%	+0.2%	-3.3%
Chg 5 Year	-10.1%	-9.7%	-4.2%

Source: Traffic Safety Bureau – Montana Department of Transportation



## E. TRAFFIC SAFETY AREAS OF CONCERN

### 1. Alcohol Involvement in Crashes

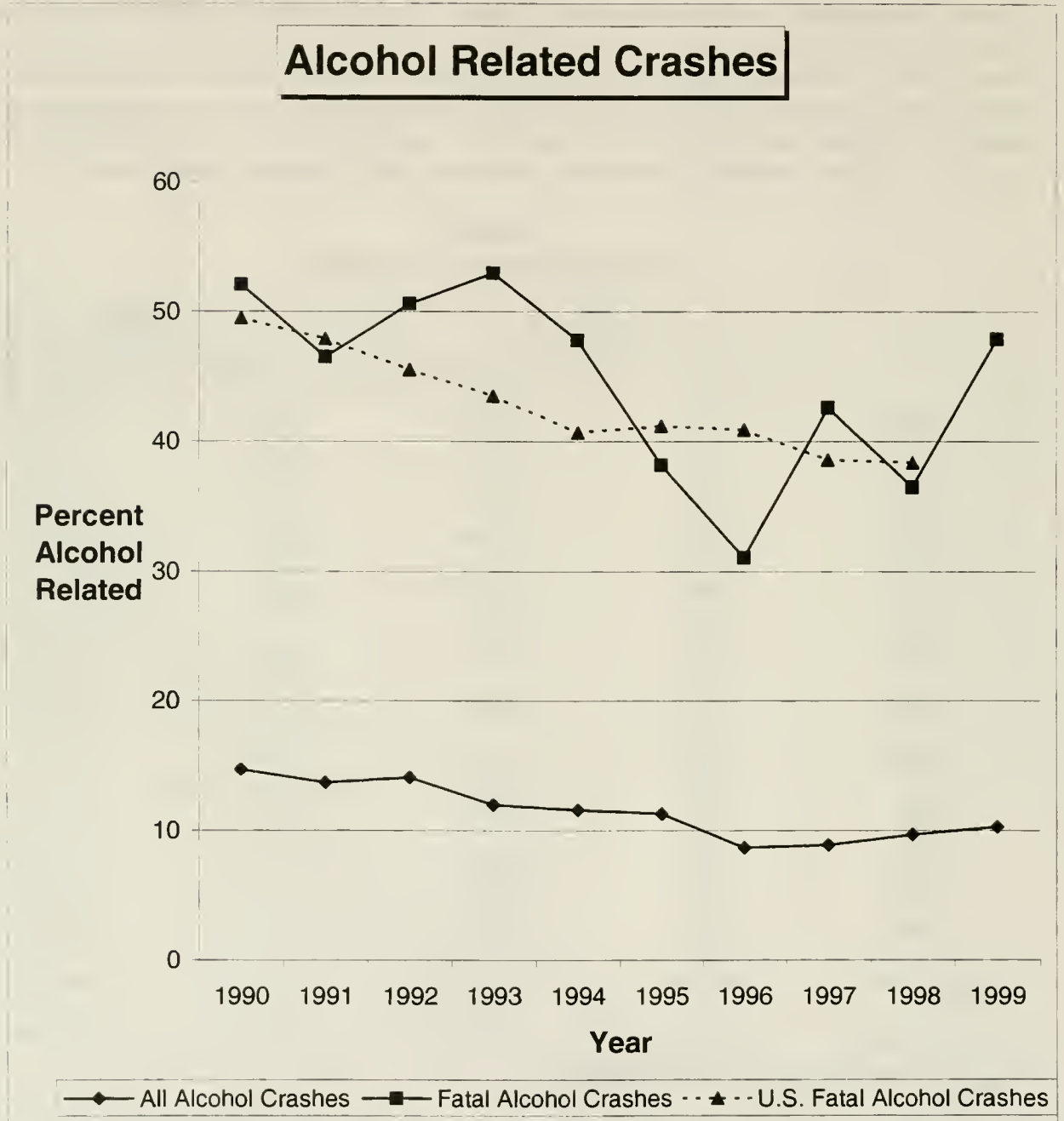
Alcohol related crashes accounted for 10.3 percent of all traffic crashes during 1999. There were slightly more crashes than in 1998. There is an upward trend over the last three years, but this is well below the 22.3% of all crashes that were alcohol related during 1983. Alcohol related crashes tend to result in more severe injuries than do crashes with no alcohol involvement. During the early 80's, fatalities related to alcohol accounted for as much as 62% of all fatalities. Last year, alcohol related fatalities were at 47.9%. Table 16 below presents the statewide alcohol related crash counts.

Table 16 <b>Alcohol Related Crashes</b>				
Year	Fatal Crashes		All Crashes	
	Alcohol Related	Percent of Total	Alcohol Related	Percent of Total
1990	99	52.1%	2412	14.7%
1991	80	46.5%	2332	13.7%
1992	86	50.6%	2437	14.1%
1993	88	53.0%	2261	12.0%
1994	87	47.8%	2245	11.6%
1995	71	38.2%	2313	11.3%
1996	55	31.1%	2156	8.7%
1997	95	42.6%	2016	8.9%
1998	76	36.5%	2142	9.7%
1999	93	47.9%	2177	10.3%
Chg 1 Year	+22.4%	+31.2%	+1.6%	+6.2%
Chg 5 Year	+21.1%	+22.1%	+0.1%	+2.6%

Source: TIS - Montana Department of Transportation

The fatality-count in 1997 and 1999 has been very high compared to 1995, 1996 and 1998. Figure 8 on the following page compares the percent of Montana alcohol related crashes with U.S. values.

Figure 8





Next, we examine alcohol-related crashes by county. The final column of table 17 shows the percentage of crashes with alcohol involvement in the county. There is a tendency for the larger urban counties to have a lower percentage of alcohol involvement in crashes. It is not known whether this implies counties with higher populations truly have less alcohol involvement because of alcohol education and related activities, or whether the larger number of intersection related fender benders reduces the percentage of alcohol involvement. It is felt that these lower percentages result from a combination of these and possibly other factors.

Table 17  
**Alcohol Related Crashes by County (1999)**

County	Alcohol Related				Percent Crashes Alcohol Related
	Fatal Crashes	Total Crashes	Fatalities	Injuries	
Beaverhead	0	23	0	19	10.6%
Big Horn	7	39	7	50	21.8%
Blaine	1	14	1	14	13.2%
Broadwater	0	20	0	25	14.2%
Carbon	1	28	6	34	11.5%
Carter	1	2	1	1	18.2%
Cascade	3	159	3	85	6.7%
Chouteau	2	12	2	7	16.2%
Custer	0	25	0	14	8.1%
Daniels	0	3	0	0	11.1%
Dawson	0	9	0	6	3.9%
Deer Lodge	1	17	1	10	12.1%
Fallon	0	2	0	2	7.4%
Fergus	0	20	0	12	6.8%
Flathead	2	212	2	197	11.8%
Gallatin	4	150	5	118	8.3%
Garfield	0	0	0	0	0.0%
Glacier	6	47	6	83	20.5%
Golden Valley	0	4	0	1	14.3%
Granite	2	7	2	1	6.9%
Hill	3	32	3	14	7.7%
Jefferson	1	36	1	29	10.9%
Judith Basin	0	9	0	9	11.1%
Lake	3	96	3	89	18.0%
Lewis & Clark	7	145	8	132	8.4%
Liberty	1	2	1	3	10.0%
Lincoln	1	45	1	36	12.6%

Table 17  
**Alcohol Related Crashes by County**

County	Fatal Crashes	Total Crashes	Fatalities	Injuries	Percent Crashes Alcohol Related
McCone	0	4	0	2	12.1%
Madison	1	24	1	15	16.8%
Meagher	0	5	0	8	11.4%
Mineral	2	23	2	16	8.3%
Missoula	8	234	8	160	10.2%
Musselshell	0	14	0	9	11.2%
Park	2	45	2	41	9.6%
Petroleum	0	4	0	1	16.7%
Phillips	1	7	2	9	10.9%
Pondera	0	17	0	17	18.1%
Powder River	0	4	0	2	10.0%
Powell	1	18	1	18	9.1%
Prairie	0	1	0	0	2.8%
Ravalli	2	76	2	53	9.2%
Richland	1	18	1	17	9.0%
Roosevelt	5	22	6	25	14.8%
Rosebud	4	15	4	16	11.6%
Sanders	0	24	0	21	11.4%
Sheridan	0	9	0	8	12.3%
Silver Bow	5	66	5	44	8.2%
Stillwater	3	29	3	22	12.2%
Sweet Grass	1	11	1	5	8.5%
Teton	1	17	1	13	12.7%
Toole	0	12	0	5	10.2%
Treasure	0	3	0	2	5.7%
Valley	1	19	1	12	14.2%
Wheatland	1	7	1	14	10.3%
Wibaux	1	5	1	3	15.6%
Yellowstone	7	286	7	222	15.5%
<b>Total</b>	<b>93</b>	<b>2177</b>	<b>102</b>	<b>1771</b>	<b>10.3%</b>

Source: TIS -- Montana Department of Transportation



DUI arrest data is not readily available in Montana. Not all arrests result in a conviction for DUI, since some are dismissed or not prosecuted and others are found not guilty. In lieu of arrest data, we now present conviction data, which is gathered by the Department of Justice. Rates per 1000 population and per million vehicle miles traveled are included in table 18.

Table 18 DUI Convictions			
Year	DUI Convictions	Convictions per 1000 Population	Convictions per Million VMT
1990	7743	9.7	0.93
1991	7800	9.7	0.94
1992	7122	8.7	0.84
1993	6872	8.3	0.80
1994	6097	7.1	0.67
1995	6697	7.7	0.71
1996	6273	7.2	0.67
1997	6217	7.1	0.67
1998	5973	6.8	0.63
1999	6117	6.9	0.
Chg 1 Year	+2.4%	+1.5%	%
Chg 5 Year	-2.1%	-3.9%	%

Source: TIS and Traffic Data Collection - Montana Department of Transportation

Data is presented for convictions by county and arresting agency in Table 19. This data is useful for local agencies and task forces in order to track their local efforts. There were 6117 convictions in 1999 compared to 5973 for the previous year. Police departments wrote a total of 2694 convictions, which accounted for 44% of the total.

Table 19  
**Montana DUI Convictions by Arresting Agency – 1999**

County	MHP	Sheriff	Police	Total	County	MHP	Sheriff	Police	Total
Beaverhead	10	13	38	61	Meagher	1	0	0	1
Big Horn	38	57	0	95	Mineral	31	30	0	61
Blaine	14	9	24	47	Missoula	127	97	276	500
Broadwater	20	16	0	36	Musselshell	4	15	0	19
Carbon	15	9	51	75	Park	18	36	28	82
Carter	0	0	0	0	Petroleum	2	1	0	3
Cascade	80	81	301	462	Phillips	7	10	0	17
Chouteau	5	2	2	9	Pondera	12	5	12	29
Custer	25	7	86	118	Powder River	3	6	0	9
Daniels	0	1	0	1	Powell	8	8	28	44
Dawson	4	15	36	55	Prairie	3	2	0	5
Deer Lodge	14	55	0	69	Ravalli	40	67	37	144
Fallon	1	1	3	5	Richland	12	9	28	49
Fergus	13	24	37	74	Roosevelt	6	2	8	19
Flathead	156	90	218	464	Rosebud	25	22	0	47
Gallatin	101	99	432	632	Sanders	16	17	27	60
Garfield	1	0	0	1	Sheridan	3	8	5	16
Glacier	58	7	32	170	Silver Bow	56	159	0	215
Golden Valley	5	1	0	6	Stillwater	18	15	13	46
Granite	7	10	0	17	Sweet Grass	20	17	0	37
Hill	35	23	49	107	Teton	8	13	0	21
Jefferson	42	15	14	71	Toole	6	16	0	22
Judith Basin	7	1	0	8	Treasure	10	1	0	11
Lake	76	19	75	216	Valley	16	2	15	33
Lewis & Clark	75	57	251	383	Wheatland	4	7	0	11
Liberty	0	2	0	2	Wibaux	5	0	0	5
Lincoln	27	29	25	81	Yellowstone	322	123	538	983
Madison	14	17	0	31	Unknown	3	252	1	385
McCone	2	2	4	8	Total	1631	1602	2694	6177

Source: Department of Justice

\*\* Totals do not add up because BIA and Unknown Enforcement are not shown

The next table examines “drivers” under age 21 involved in crashes. Those drivers involved in all crashes and in alcohol related crashes are compared. It should be emphasized that the counts are for drivers of age 20 and under (not crashes). It could include a few instances where the young driver had not been drinking, but another older involved driver had been drinking. Fortunately, most alcohol related crashes involve only one vehicle.

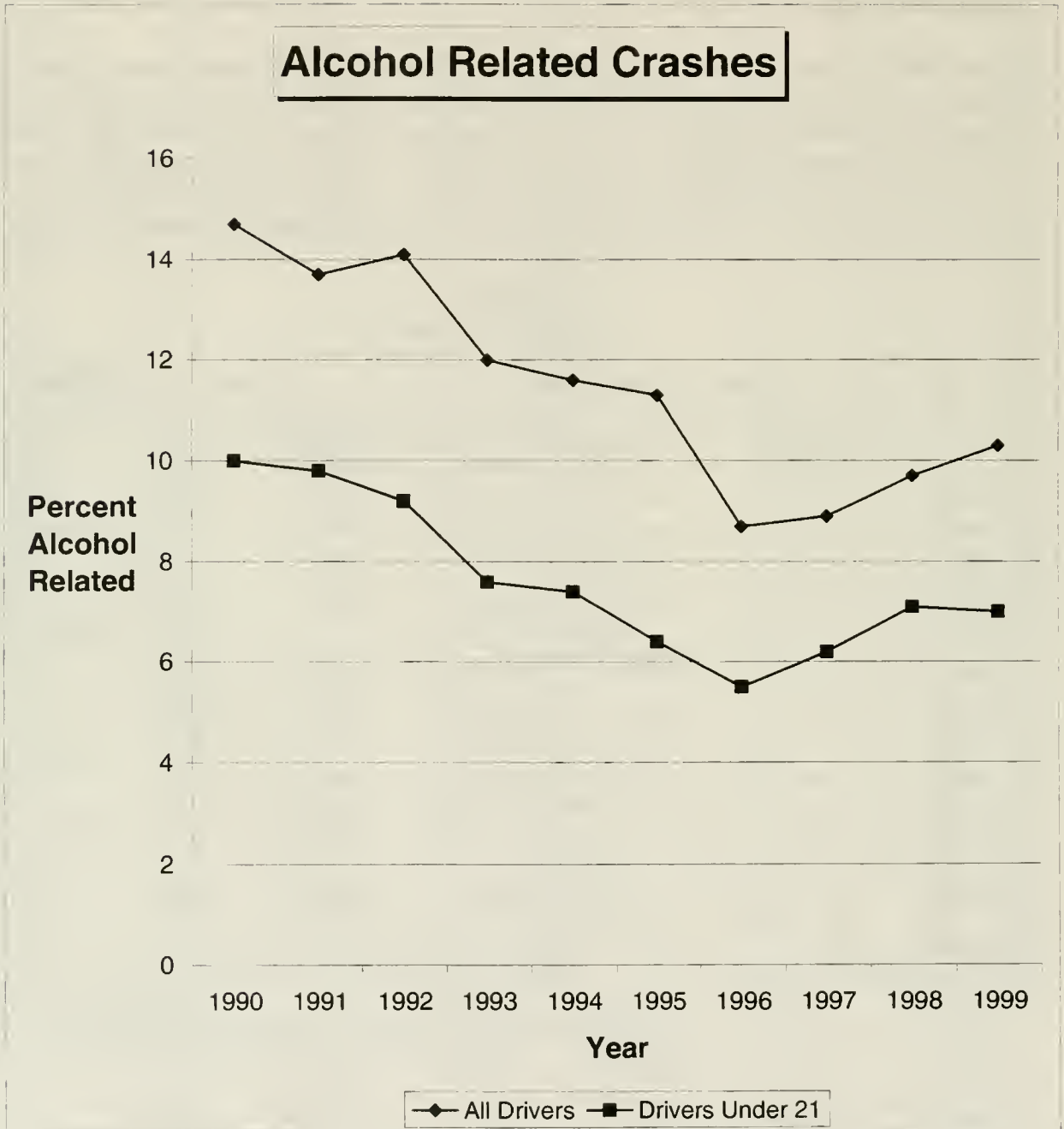
Since 1984, when laws were changed, young drivers have responded more to the drinking and driving problem than has the general population. When these young drivers are involved in crashes, 7.0% of the crashes involve alcohol, while the rate is 10.3% for all drivers regardless of age. There is some concern that during the last three years this percentage has moved upward, from a low of 5.5%. Table 20 examines the percent of crashes involving alcohol when comparing teens to adults.

Table 20 Drivers Under 21						
Year	Drivers in Fatal Crashes			Drivers In All Crashes		
	Alcohol Related	All	Percent of All	Alcohol Related	All	Percent of All
1990	24	46	52.2%	605	6051	10.0%
1991	15	33	45.5%	584	5964	9.8%
1992	14	38	36.8%	580	6319	9.2%
1993	19	45	42.2%	523	6866	7.6%
1994	21	54	38.9%	520	7051	7.4%
1995	14	38	36.8%	492	7672	6.4%
1996	16	46	34.8%	449	8196	5.5%
1997	19	47	40.4%	491	7958	6.2%
1998	14	44	31.8%	534	7503	7.1%
1999	23	55	41.8%	497	7064	7.0%
Chg 1 Yr	+64.3%	+25.0%	+31.4%	-6.9%	-5.9%	-1.4%
Chg 5 Yr	+36.9%	+20.1%	+14.4%	0.0%	-8.0%	+7.4%

Source: TIS – Montana Department of Transportation

Figure 9 on the following page examines these trends over time. The general decline in percentage of alcohol related crashes until 1996 is shown.

Figure 9





## **2. Occupant Protection**

Montana's seat belt law was enacted October 1, 1987. Penalties began January 1, 1988. The law was written for secondary enforcement and covered all seating positions within vehicles. When a law is secondary, it means that you can not specifically stop the vehicle for not wearing restraints. There needs to be another reason for the stop. Sponsors of this bill felt that with the amount of contacts which law enforcement officers have with the driving public, that this would still give ample opportunity to enforce the law. A primary law tends to increase usage over secondary enforcement.

Montana's restraint usage rates are shown on the next page in Table 21. Rates are determined from an approved NHTSA observational survey. The survey is conducted four times per year at 120 locations. Rates shown in the table are an average of each year's four surveys.

Montana restraint usage increased from 16.8% in 1984 to 33.3% in October 1987 before a mandatory seat belt bill became law. This gain was mostly acquired by conducting seat belt incentive give away campaigns in many of Montana's cities during this period. When the enforcement of the law began, usage jumped to 56% and has gradually increased since that time. The current level of usage is 74.0%. The historical changes in usage for the last ten years appear in this table.

Data from the four surveys each year, show that usage tends to have an annual cycle. Usage is usually two to three percentage points higher in summer than in winter. This cycle is likely caused by a greater percentage of short trips during the winter. Tourists from other states and Montana tend to increase usage in summer due to the fact that families traveling together have a tendency for higher usage than when just one person is in the vehicle.

The interstate, primary, city and other usage rates all increased in 1999. The other category, which is made up with secondary and county roads, has increased the most over the last two years. Future efforts need to emphasize the 'city streets' and 'other roadway' categories. These two road types have high crash rates but lower restraint usage rates, because of a tendency for short trips. Vehicle occupants may think that there is less chance of serious injury on these roads. They may think this since these roads tend to be local and the traveling speed is sometimes slower. Just the opposite is true.



Table 21  
**Seat Belt Usage Rates**

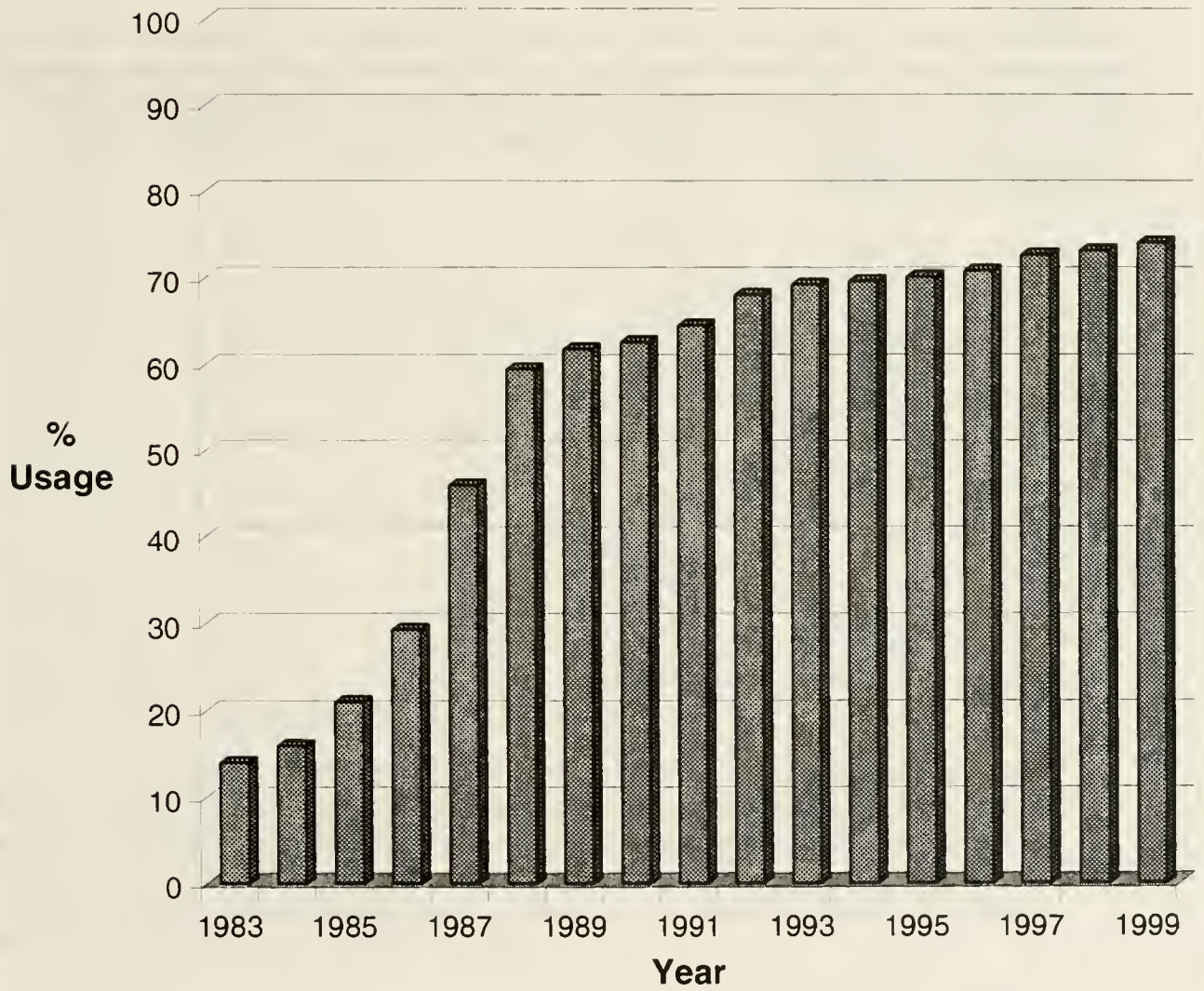
Year	Interstate	Primary	City	Other	All Roads
1990	79.1%	70.5%	40.2%	48.4%	62.6%
1991	80.9%	72.8%	41.4%	49.3%	64.5%
1992	83.1%	75.3%	47.8%	53.7%	68.0%
1993	84.2%	75.9%	49.6%	56.2%	69.2%
1994	84.7%	75.4%	51.1%	56.4%	69.6%
1995	86.4%	75.0%	51.3%	57.5%	70.1%
1996	86.2%	75.5%	51.8%	61.0%	70.8%
1997	87.9%	79.3%	52.4%	60.2%	72.6%
1998	88.4%	78.2%	54.0%	63.5%	73.1%
1999	89.1%	78.9%	55.3%	65.0%	74.0%
Chg 1 Year	+0.8%	+0.9%	+2.4%	+2.4%	+1.2%
Chg 5 Year	+2.7%	+2.9%	+6.1%	+8.8%	+3.9%

Source: TIS – Montana Department of Transportation

On the following page, figure 10 shows a graph of Montana's seat belt usage since 1983.

Figure 10

## Seat Belt Usage



The table on the following page shows seat belt citations by arresting agency. Over 17,000 citations were issued in Montana during 1999. This is 5,000 more than were issued in 1997. The Montana Highway Patrol writes about 70% of the tickets statewide. Funding for overtime enforcement was provided to the patrol during the summer to help bring citation numbers up.

Montana restraint usage has been growing steadily, but slowly over the past few years. Police departments account for almost 25% of statewide citations and sheriff departments account for about 3%. Increases in local enforcement may be needed in order to encourage higher usage on local roads and city streets.

The data in Table 22 reflects our continuing need to provide an incentive to local law enforcement in the whole field of traffic safety. The smaller local enforcement agencies, do not usually write significant numbers of seat belt citations. The Bureau of Indian Affairs Police continues to issue very few citations. Reservation seat belt usage continues to be quite low.

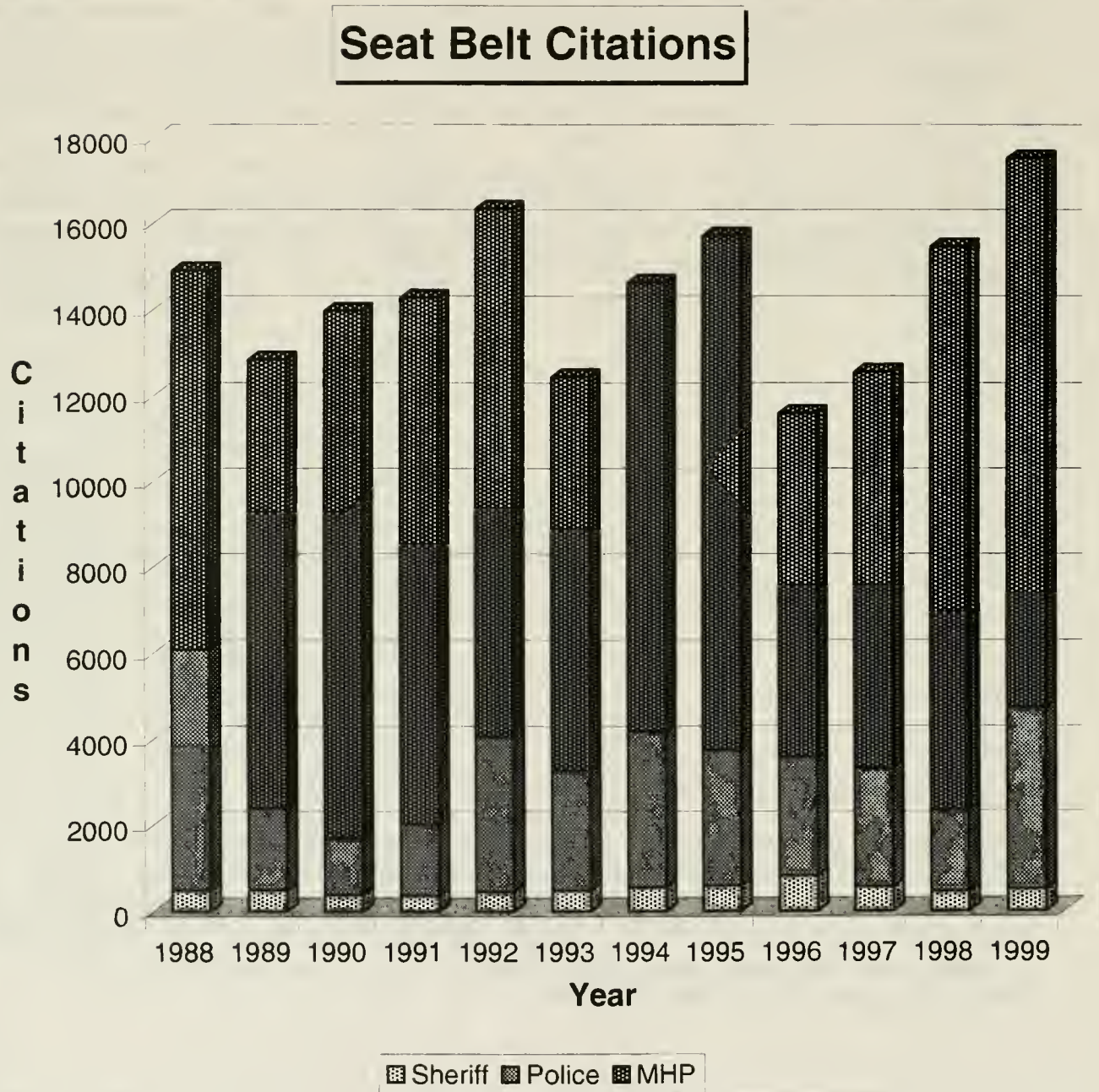
Table 22 Seat Belt Citation Convictions by Issuing Agency					
Year	Police	Sheriff	MHP	BIA	Total
1988	5,612	478	8,818	0	14,908
1989	1,907	483	10,463	0	12,853
1990	1,316	379	12,277	0	13,972
1991	1,658	355	12,266	15	14,294
1992	3,611	453	12,282	62	16,408
1993	2,798	474	9,187	106	12,565
1994	3,654	546	10,432	70	14,702
1995	3,170	585	11,971	38	15,764
1996	2,781	815	8,036	5	11,637
1997	2,787	562	9,247	11	12,607
1998	1,904	456	13,158	75	15,593
1999	4,315	502	12,892	24	17,733
Chg 1 Year	+127%	+10.1%	-2.0%	-68.0%	+13.7%
Chg 5 Year	+50.9%	-15.3%	+22.0%	-39.7%	+26.1%

Source: TIS – Montana Department of Transportation

The number of citations written by police departments increased significantly during 1999. They wrote more than double the citations that were written in 1998. At the same time, the Montana Highway Patrol and Sheriff's departments wrote about the same number of tickets as in 1998. This increase by police should help increase usage in cities, where the lowest usage exists. Figure 11 on the next page shows tickets written during the twelve years of the law.



Figure 11





Injuries and fatalities to occupants ages four and under are of interest in relation to child safety and child restraint usage. The following table shows the history of injury data over the last twenty-one years. Injuries have increased over the last eight years. During the early 1970's, the fatalities for this age group were usually between ten and fifteen. When child restraints became more common, these numbers dropped. Rental programs and publicity during the eighties helped reduce injuries to a level of 154 in 1991. Injury numbers have generally increased since. Changes in the crash reporting form in 1996 may have resulted in more complete reporting of children as occupants and their restraint usage, thus causing part of this increase.

Table 23 Occupant Injuries – Age Four and Under		
Year	Fatalities	Injuries
1978	4	235
1979	5	221
1980	4	199
1981	2	244
1982	3	220
1983	3	215
1984	1	198
1985	2	178
1986	5	161
1987	4	196
1988	5	164
1989	5	174
1990	2	159
1991	4	154
1992	3	160
1993	0	166
1994	6	188
1995	3	170
1996	6	209
1997	6	228
1998	3	283
1999	1	288
Change 1 Year	-66.7%	+1.8%
Change 5 Year	-69.2%	+33.6%

Source: Montana Department of Transportation



### **3. Driver's Hazardous Actions and License Compliance**

#### **a. Speed and Hazardous Driver Actions**

When the national speed limit was rescinded December 8, 1995, Montana no longer had a specific daytime speed limit. The Montana "basic rule" law required that vehicles be driven "... in a careful and prudent manner and at a rate of speed no greater than is reasonable and proper under the conditions existing at the point of operation...". The Montana Supreme Court declared this law unconstitutional during late 1998. At that time, there was truly no control of speed in Montana, except for careless driving.

The 1999 legislature passed a speed limit bill that became law on Memorial Day weekend of 1999. The limit on the interstate for passenger vehicles is 75, while the other non-interstate routes have a speed limit of 70 mile per hour limit. Night speeds are 75 on the interstate and 65 on non-interstate routes. Trucks have limits that are somewhat slower. These changes in speed limits may have some impact on traffic safety in Montana. It will take some time for the numbers to be large enough in order to analyze the data with any statistical certainty.

Certainly the new limit will help solve the issue of out-of-state drivers. Drivers from out-of-state drove significantly faster than Montanans. This may have had much to do with the fact that these drivers simply did not understand the basic rule law. Montanans, through experience, did understand that there was a speed limit which just didn't have a specific number attached.

Characteristics recorded about the driver and his or her actions leading up to crashes are now examined. Hazardous actions in crashes as determined by the investigating officer are summarized in Table 24.

Table 24  
**Hazardous Actions in Crashes**

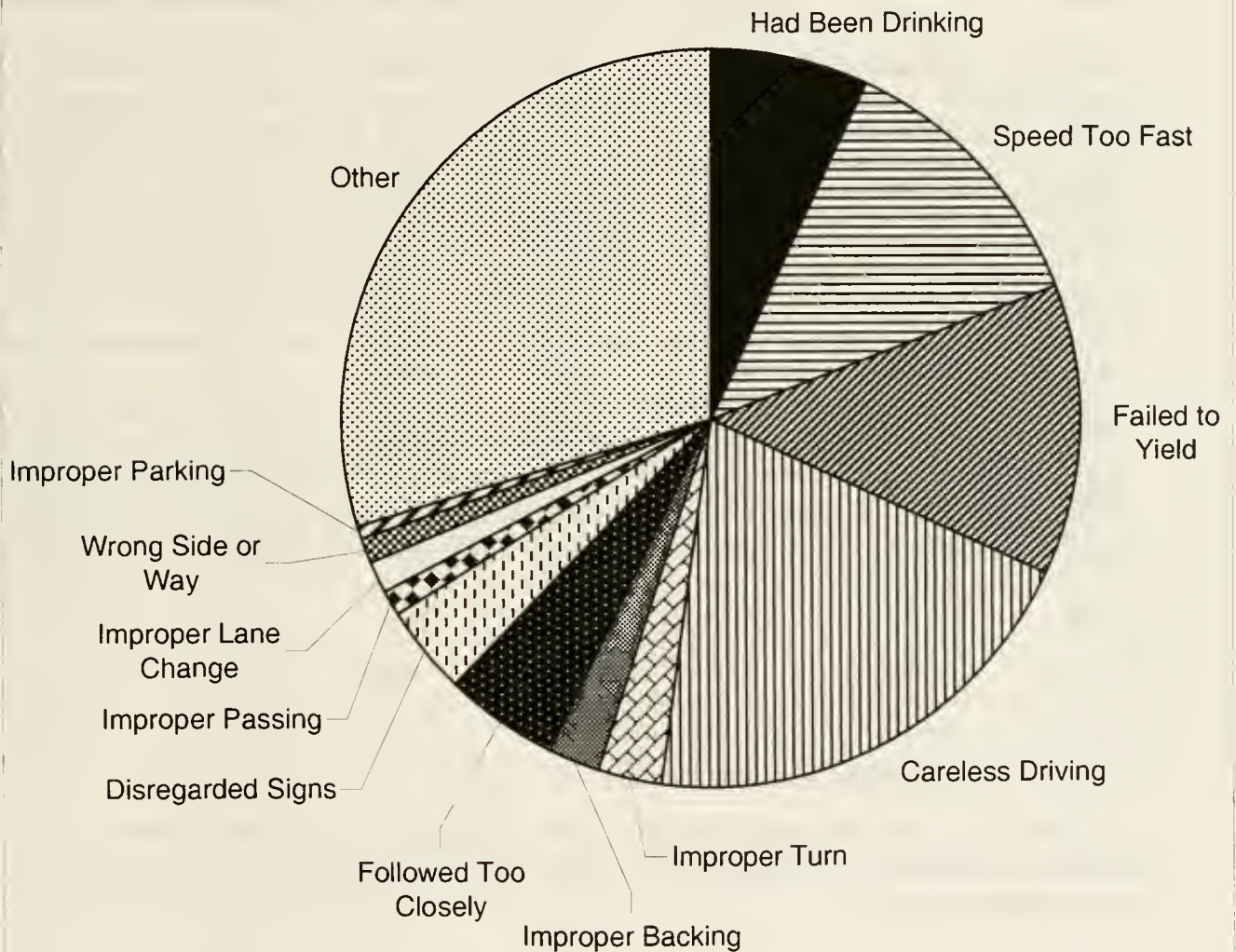
Year	Alcohol	Speed Too Fast	Failed to Yield	Careless Driving	Improper Turn	Improper Backing
1990	1439	2482	3161	3120	529	370
1991	1436	2620	3125	3264	461	393
1992	1529	2266	3385	3397	503	435
1993	1422	2890	3832	3503	514	471
1994	1382	2883	3664	3813	530	487
1995	1532	2887	3902	4133	531	493
1996	1948	6146	4480	3924	893	797
1997	1791	4806	4040	4313	865	710
1998	1816	4462	3687	4645	753	718
1999	1851	3335	3483	5492	713	633
Chg 1 Yr	+1.9%	-25.3%	-5.5%	+18.2%	-5.3%	-11.8%
Chg 5 Yr	+9.3%	-21.3%	-11.9%	+31.8%	-0.2%	-1.2%

Source: TIS – Montana Department of Transportation

The change to no day-time numerical speed limit in late 1995 along with a new crash reporting form has affected the category of hazardous actions. Speed too fast for conditions took a jump in 1996. The new form contained some new codes, which may have had an effect on the numbers. A speed limit became effective at the beginning of the Memorial Day weekend in 1999. This had an immediate impact on “Speed Too Fast For Conditions” during 1999. Figure 12 on the following page shows a percentage breakout for driver’s hazardous actions in crashes for 1999.

Figure 12

## Hazardous Actions in Crashes -- 1999





b. Driver's License Compliance:

The next table examines the license status of each driver at the time of involvement in a traffic crash.

Table 25 License Status for Drivers in Crashes						
Year	Valid License	No License	Probationary	Expired	Suspended	Revoked
1990	23,564	1014	152	276	160	211
1991	24,460	1120	153	275	196	249
1992	25,004	1156	147	270	214	231
1993	28,116	887	188	293	227	255
1994	28,301	1002	149	299	237	277
1995	30,016	950	163	309	238	295
1996	35,953	700	181	348	275	342
1997	32,366	702	164	367	416	222
1998	29,948	658	145	389	410	240
1999	28,810	654	173	382	501	265
Chg 1 Yr	-3.8%	-0.6%	+19.3%	-1.8%	+22.2%	+10.4%
Chg 5 Yr	-8.0%	-18.5%	+7.9%	+11.6%	+58.9%	-3.7%

Source: TIS – Montana Department of Transportation

The number of drivers involved in crashes, with suspended and expired licenses continues to increase. At the same time those with no license are slowly decreasing over the last ten years.

#### **4. Traffic Records**

Traffic safety data and specifically crash data are an important part of any highway safety program. Without timely and relevant data, a traffic safety program can not efficiently operate. The new crash system and reporting form were developed during 1994 and 1995. This new system replaced Montana's 25 year old Highway Information System (HIS) on January 1, 1996. The new system is part of the overall Transportation Information System (TIS) supported by the Montana Department of Transportation. Included with this new system is an on line road log, traffic counts, a GIS database which contains a photo log of all on system roads in the state.

Computers are beginning to show up in enforcement vehicles. Several local law enforcement jurisdictions currently have laptops mounted in their cars. Traffic Safety contracted with the Highway Patrol to develop a software system for input of crash data of reportable crashes at the scene. Quest Inc. was subcontracted to develop the system. This software was completed but contained problems with occupant records being handled improperly. Part of the system will be rewritten this year to resolve this problem. The system is being made available to all Montana jurisdictions, free of charge, to use for crash reporting. The data produced by this system will be able to be added to the current crash database without data entry.

Current plans of Traffic Safety relating to traffic records include an ongoing study to write a strategic plan on areas needing improvement over the next few years. This traffic records group includes members from many areas of the Department of Justice, Department of Transportation and local governments that have concerns with traffic records. Once this plan is completed, attempts to fund and implement parts of this plan will occur.



## **5. Emergency Medical Services**

Emergency Medical Services differs from many program areas in Traffic Safety because there is no intention of affecting the number of crashes. Theoretically, better EMS will reduce the number of fatalities and complications from severe injuries. Table 26 lists the number of crashes involving fatalities or incapacitating injuries by county. This provides a basis for approximating the need of EMS as related to traffic crashes by area.

Table 26  
**Severe Injury Crashes by County – 1999**

County	Severe Crashes	County	Severe Crashes
Beaverhead	16	Madison	18
Big Horn	33	Meagher	6
Blaine	12	Mineral	16
Broadwater	9	Missoula	235
Carbon	25	Musselshell	9
Carter	2	Park	28
Cascade	68	Petroleum	5
Chouteau	10	Phillips	7
Custer	12	Pondera	9
Daniels	1	Powder River	0
Dawson	6	Powell	19
Deer Lodge	12	Prairie	1
Fallon	2	Ravalli	63
Fergus	15	Richland	9
Flathead	134	Roosevelt	11
Gallatin	65	Rosebud	14
Garfield	1	Sanders	20
Glacier	47	Sheridan	7
Golden Valley	1	Silver Bow	39
Granite	10	Stillwater	23
Hill	14	Sweet Grass	7
Jefferson	34	Teton	10
Judith Basin	8	Toole	11
Lake	58	Treasure	5
Lewis and Clark	84	Valley	10
Liberty	2	Wheatland	10
Lincoln	43	Wibaux	3
McCone	1	Yellowstone	138

Source: TIS – Montana Department of Transportation

The county with the most severe crashes in Montana was Missoula with 235. Yellowstone was next with 138, and Flathead right behind with 134. Following, these three counties, there is a significant drop in numbers to Lewis and Clark, Cascade, Gallatin, Ravalli, Lake and Glacier.

No computerized data currently exists which tracks response times of ambulances, or other data related to care given. It becomes difficult to improve the system without this type of information. The EMS Bureau and related agencies, such as hospitals and ambulance services have over the last few years been examining the potential for designing a pre-hospital data system.

In 1995, EMS obtained enough funding for a pilot project and study. This pilot study was completed and recommendations for a pre-hospital data system were made. The Critical Illness & Trauma Foundation located in Bozeman received a grant in 1995 and the EMS Bureau received another grant that was used to improve training for care to children and data acquisition. These agencies are responsible for a project called TENKIDS. This project placed computers in most ambulance services in the state. The services use these computers for training. In addition, the computers will now be used for ambulance trip report data to be entered by the services. Some of this data will be transferred to the state EMS Bureau. The software for this is currently being developed.



## 5. Motorcycle Involvement in Crashes

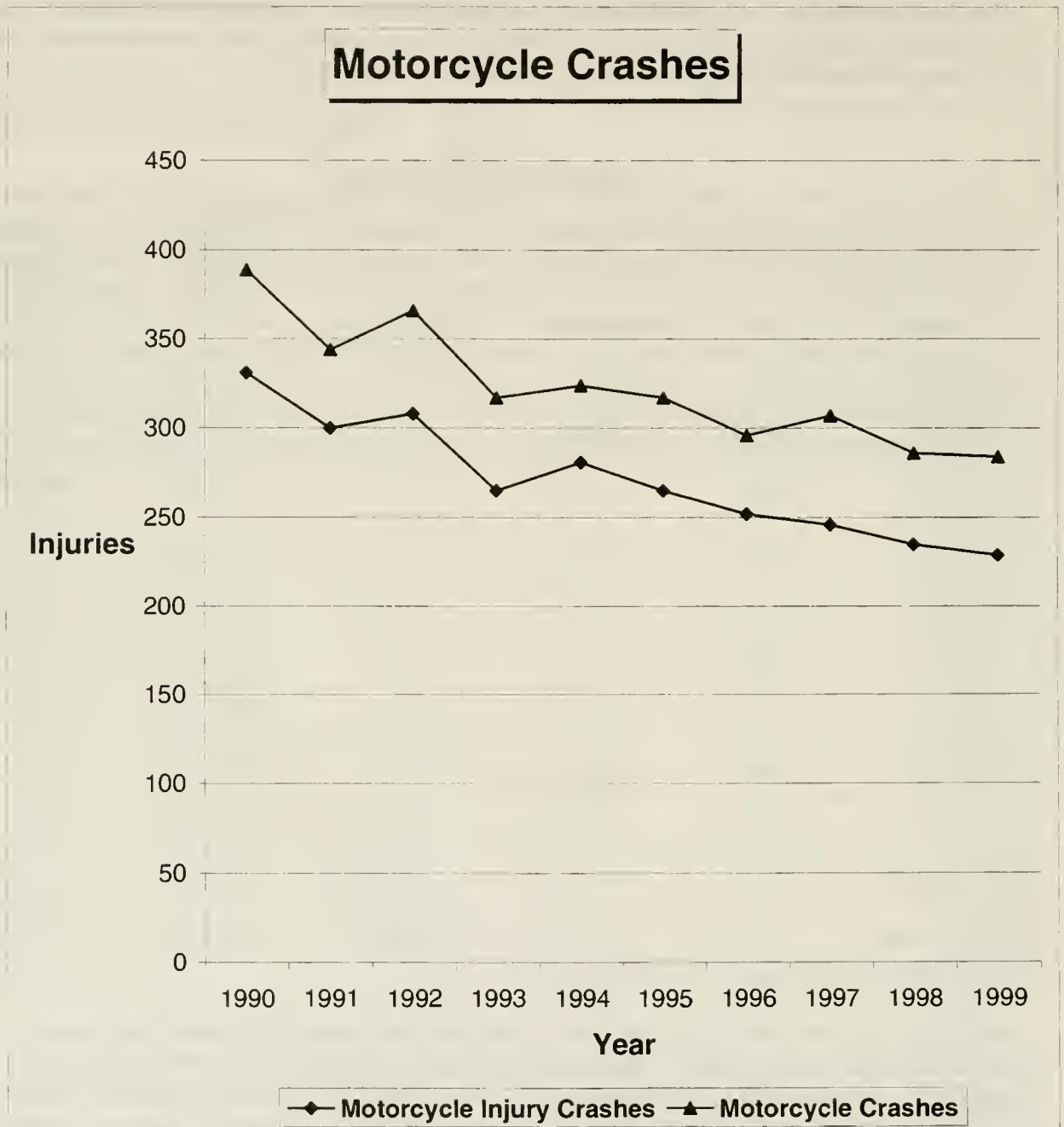
Motorcyclists in traffic crashes comprise a relatively small percentage of all persons involved in crashes. However, these persons are at much greater risk when involved in a crash. Because of this, motorcycles account for a significant amount of fatalities and serious injuries. Table 27 shows the number of motorcycle crashes and the fatal and injury results from these crashes over the last ten years.

Table 27 Motorcycle Crashes					
Year	Crashes	Percent of All Crashes	Fatal Crashes	Percent of all Fatal Crashes	Injury Crashes
1990	389	2.4%	15	7.9%	331
1991	344	2.0%	10	5.8%	300
1992	366	2.3%	12	7.1%	308
1993	317	1.7%	17	10.2%	265
1994	324	1.7%	13	7.1%	281
1995	317	1.5%	14	7.5%	265
1996	296	1.2%	8	4.5%	252
1997	307	1.4%	18	8.1%	246
1998	286	1.3%	13	6.3%	235
1999	284	1.3%	15	7.7%	229
Chg 1 Year	-0.7%	---	+15.4%	+22.2%	-2.6%
Chg 5 Year	-7.2%	-8.5%	+13.6%	+14.9%	-10.5%

Source: TIS – Montana Department of Transportation

Motorcycle crashes and injury crashes have been decreasing in recent years and continued that trend in 1999. These crashes accounted for only 1.3% of all crashes. However, motorcycle fatality crashes accounted for 7.7% of all fatal crashes. These crashes resulted in 15 fatalities and 270 injuries for 1999. Figure 13 on the following page shows the trend in motorcycle crashes and injuries.

Figure 13



The next table shows helmet usage for drivers and passengers in motorcycle crashes. Usage was quite low for all ages. Those between 35 and 64 wore helmets somewhat more often than the other age groups. However, the usage in this age group was still below 42 percent.

<p>Table 28</p> <p><b>Motorcycle Helmet Use by Age</b></p> <p>(1999 Data)</p>				
Age	Driver		Passenger	
	Used	Not Used	Used	Not Used
14 & Under	2	0	1	3
15-17	3	5	1	1
18-19	3	6	1	2
20-24	10	28	3	6
25-34	14	25	3	5
35-64	54	72	8	14
65 & Over	3	0	1	0
Not Stated	19	40	0	0
Total	108	176	18	31

Source: TIS - Montana Department of Transportation

The helmet use survey shows a relatively low usage of helmets in cities and on local roads. Helmet use is 34% in the cities, while it is 74% on primary roads. The overall usage rate is 59% based upon a sample size of only 177 observations.

The next table compares motorcycle injury severity with injury severity in crashes for all vehicles. Although it is obvious that motorcycle crashes will result in much higher severity of injuries, it is worth the effort to show just how much at risk are these individuals. The data in Table 29 shows that severe injuries and fatalities occur in a much higher percentage of motorcycle crashes than in all crashes.

Table 29  
**Motorcyclist Injury Severity Comparison – 1999**

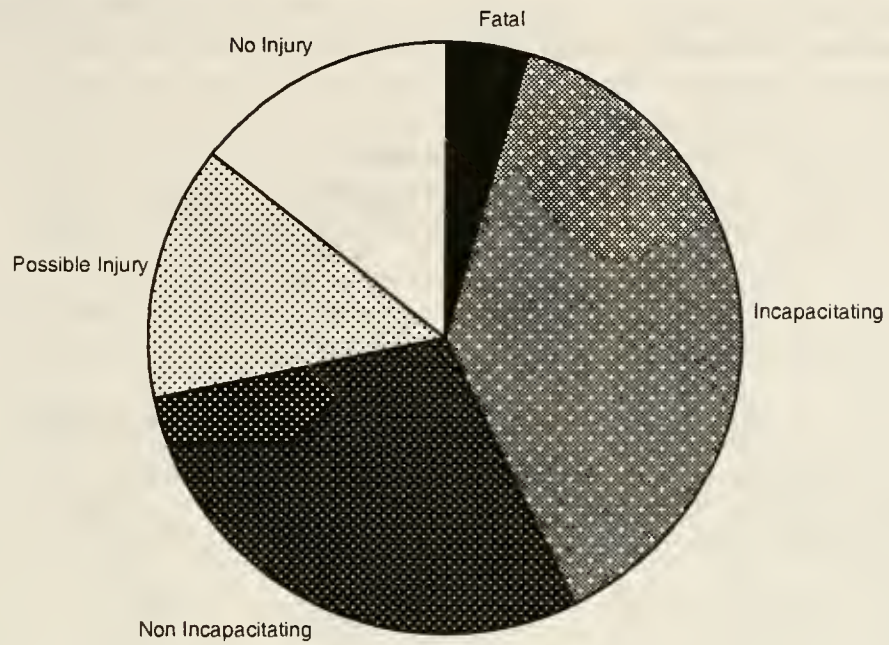
Injury Severity	Crashes Involving Motorcycles		All Crashes	
	Injuries	Percentage	Injuries	Percentage
Fatalities	15	4.5%	220	0.5%
Incapacitating Injury	127	38.1%	1,739	3.6%
Non Incapacitating	97	29.1%	3,254	6.1%
Possible	46	13.8%	5,759	10.4%
No Injury	48	14.4%	38,014	79.4%
Total People	333	---	48,986	---

Source: TIS - Montana Department of Transportation

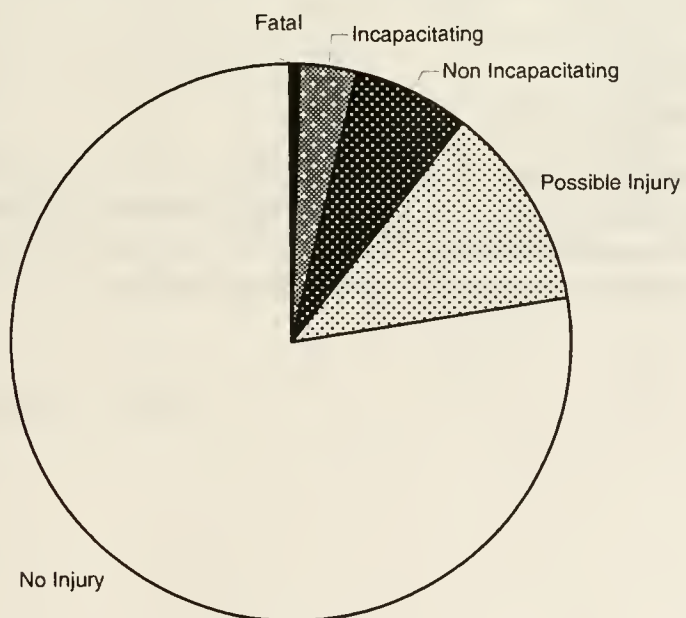
An straight forward interpretation of this data indicates that the risk of fatality or severe injury for a motorcyclist in a crash is very high. Motorcycle drivers and passengers who are killed or incapacitated account for 42.6% of all riders in crashes. By comparison 4.1% of drivers and passengers in all motor vehicle crashes receive fatal or incapacitating injuries. The chance of severe injury is more than ten times higher when riding motorcycles. For a graphical representation, see the pie charts in figure 14 on the following page.

Figure 14

### Motorcyclist Injury Severity



### All Vehicle Occupants Injury Severity





In the next table, we examine the age of motorcycle fatality victims. Most fatalities in the past occurred in the 20-34 year age group. However, in recent years there has been a shift occurring with most fatalities coming from the 35 to 64 age group.

Table 30 Motorcycle Fatalities by Age								
Year	Age Groups							
	0-14	15-17	18-19	20-24	25-34	35-64	65+	Total
1990	0	1	1	0	11	2	1	16
1991	0	0	0	5	5	0	0	10
1992	0	2	0	1	4	6	0	13
1993	0	0	3	6	3	9	0	21
1994	0	0	2	0	3	8	0	13
1995	0	0	1	1	4	10	0	16
1996	0	0	2	2	1	4	0	9
1997	0	1	2	2	4	11	0	20
1998	0	0	1	0	3	8	2	14
1999	0	0	0	2	3	10	0	15
10 Yr Total	0	4	12	19	41	68	3	147

Source: TIS – Montana Department of Transportation

Motorcyclist deaths continue to be a major problem in the state. Severe injuries have a large impact because of the cost to the public and private sectors. Data from the state's trauma registry and CODES project should help pinpoint the costs associated with these injuries and provide additional information.

## **7. Collisions with Pedestrians**

A general summary of pedestrian collisions is shown below in Table 31. The number of these collisions has been low during 1990 and 1991 and again in 1999. It should be noted that pedestrian collisions as a percent of all crashes are continuing to drop having reached a low of only 0.7%. Fatal crashes have been slowly declining during the last 20 years, and are well below numbers during the 1970's. These crashes account for 3.1% of all crashes. Fatalities during 1997 and 1999 were two of the lowest years for some time.

**Table 31**  
**Motor Vehicle Collisions with Pedestrians**

Year	Crashes	% of All Crashes	Fatal Crashes	% of all Fatal Crashes	Fatalities	Injury Crashes	Injuries
1990	140	0.9%	9	4.7%	9	137	159
1991	146	0.9%	12	7.0%	12	147	182
1992	161	0.9%	12	7.0%	12	151	160
1993	160	0.8%	11	6.6%	11	156	170
1994	169	0.9%	11	6.0%	11	155	170
1995	185	0.9%	12	6.5%	12	171	196
1996	180	0.7%	13	7.3%	13	149	178
1997	167	0.7%	9	4.0%	9	136	146
1998	166	0.8%	13	6.3%	13	135	148
1999	153	0.7%	7	3.1%	7	128	139
Chg 1 Year	-7.8%	-12.5%	-46.2%	-42.8%	-46.2%	-5.2%	-6.1%
Chg 5 Year	-11.8%	-12.5%	-39.7%	-40.2%	-39.7%	-14.2%	-17.1%

Source: TIS – Montana Department of Transportation

Table 32 lists the pedestrian injuries plus fatalities by age of casualty. Casualties tend to be spread among all ages, but there is some concentration of injuries from ages 5 to 24. Injuries from pedestrians makes up a small percentage of total injuries in the state, but the number of pedestrian fatalities still makes up a significant amount of the total number of fatalities.

<p style="text-align: center;">Table 32 <b>Pedestrian Casualties by Age</b></p>									
Year	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1990	12	49	18	25	19	9	9	12	158
1991	14	51	33	21	18	9	9	15	175
1992	11	43	33	24	19	8	10	16	171
1993	10	46	31	21	23	12	10	15	173
1994	9	44	37	24	20	15	4	15	176
1995	11	58	37	17	18	17	7	23	193
1996	3	38	30	28	23	15	7	27	171
1997	8	32	33	11	20	13	13	19	149
1998	2	28	38	13	24	17	10	20	152
1999	4	28	17	7	11	14	8	48	151
10 Yr Total	84	417	307	191	195	129	87	210	1669

Note: The totals for each year may not equal the total because of a small amount of cases where no age was noted on the accident report.

Source: TIS – Montana Department of Transportation

Table 33 shows a summary of actions of the pedestrian during and before the time of the collision. Coding changes to the categories on the new crash reporting form beginning in 1996 may affect the numbers in some categories.

Table 33 Pedestrian Injuries by Action						
Year	At Intersection or Crosswalk	Not at Intersection or Crosswalk	Walking or Standing In Road	Working on or Pushing Vehicle	Playing or darting into Roadway	Other
1990	78	27	18	10	1	23
1991	83	43	16	9	2	22
1992	83	35	15	4	4	33
1993	70	44	15	3	6	35
1994	80	41	20	3	4	28
1995	93	42	19	5	9	24
1996	47	32	24	6	25	37
1997	35	24	29	5	24	32
1998	56	18	28	7	19	25
1999	60	12	13	3	26	23
Chg 1 Yr	+7.1%	-33.3%	-53.6%	-57.1%	+36.8%	-8.0%
Chg 5 Yr	-3.5%	-61.8%	-45.8%	-42.3%	+60.5%	-21.2%

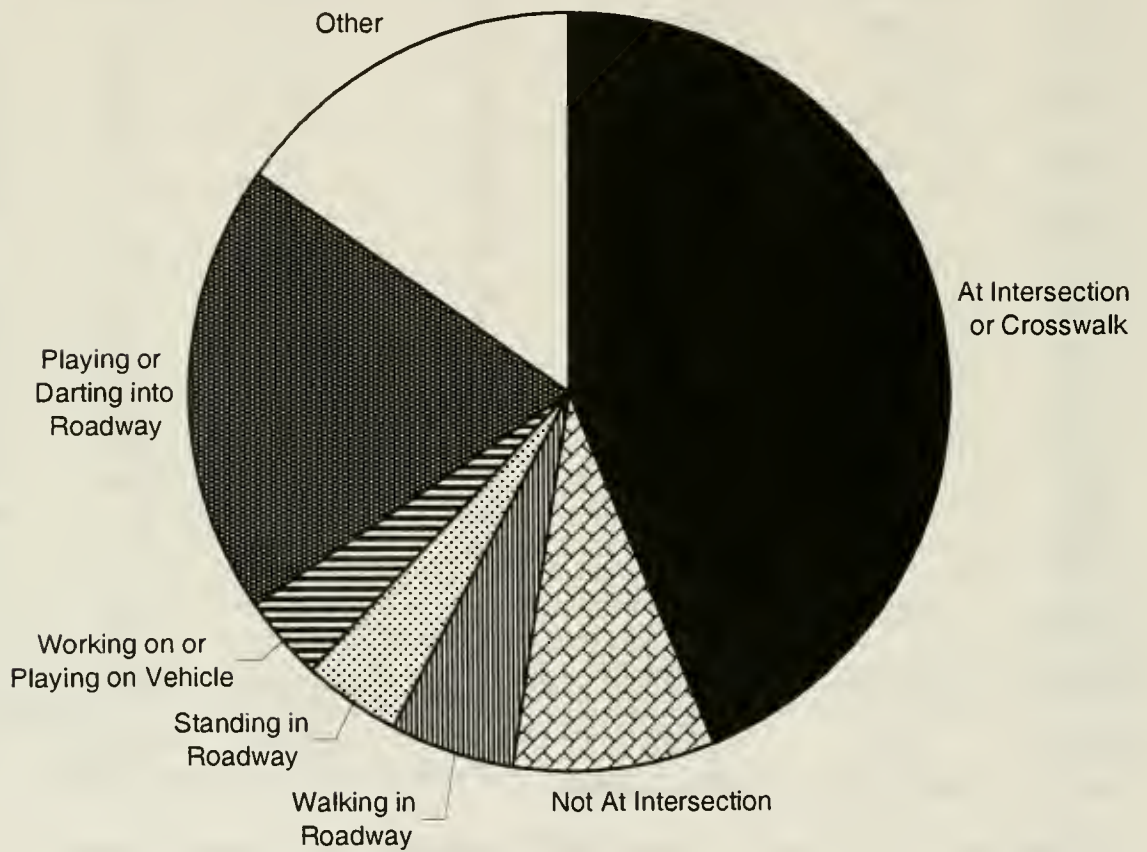
Source: TIS – Montana Department of Transportation

\* The data from 1996-99 does not compare well with data before 1996 because of change in accident reporting form

Figure 15 on the following page shows a pie chart for all pedestrian collisions by action during 1999.

Figure 15

### Pedestrian Action in Crashes





## 8. Collisions with Bicyclists

Bicycle crashes with motor vehicles, as a percentage of total motor vehicle crashes, reached a low in 1996. Over the last five years there was an average of 1.6 fatal crashes, while the five years between 1988 and 1992 resulted in an average of 3.2 fatal crashes.

Table 34  
**Motor Vehicle Collisions with Bicyclists**

Year	Crashes	Percent of All Crashes	Fatalities	Percent of all Fatalities	Injuries
1990	169	1.03%	4	2.11%	164
1991	146	0.86%	1	0.50%	151
1992	180	1.04%	5	2.94%	180
1993	149	0.79%	1	0.60%	155
1994	208	1.07%	2	1.10%	203
1995	197	0.96%	1	0.47%	203
1996	180	0.74%	2	1.13%	158
1997	224	0.99%	1	0.38%	202
1998	198	0.90%	1	0.42%	183
1999	178	0.84%	3	1.36%	183
Chg 1 Year	-10.1%	-9.1%	+200%	+224%	---
Chg 5 Year	-11.6%	-9.9%	+114%	+94.3%	-3.6%

Source: TIS – Montana Department of Transportation

Table 35 presents bicyclist injuries including fatalities by age of the casualty. Bicyclist injuries tend to be concentrated in the ages from 5 to 19. The 10-14 year old age group remains the highest casualty group. In recent years, there are increasing numbers of injuries in the higher age groups. Total bicycle injuries were nearly the same as in 1998.

Table 35 Bicyclist Casualties by Age								
Year	0-9	10-14	15-19	20-24	25-34	35-54	55+	Total
1990	32	61	24	22	14	8	4	168
1991	38	47	24	15	13	14	2	153
1992	31	61	21	15	19	24	10	184
1993	37	49	15	17	19	15	1	158
1994	45	59	34	16	23	18	4	204
1995	41	67	30	19	20	23	4	204
1996	29	48	25	17	17	21	2	160
1997	38	62	33	19	19	24	6	202
1998	28	50	14	18	28	33	12	184
1999	28	36	23	14	13	26	27	186
10 Yr Total	347	540	243	172	185	206	72	1803

Note: The totals for each year may not equal the total because of a small amount of cases where no age was noted on the accident report.

Source: TIS – Montana Department of Transportation

## 9. Truck Involvement In Crashes

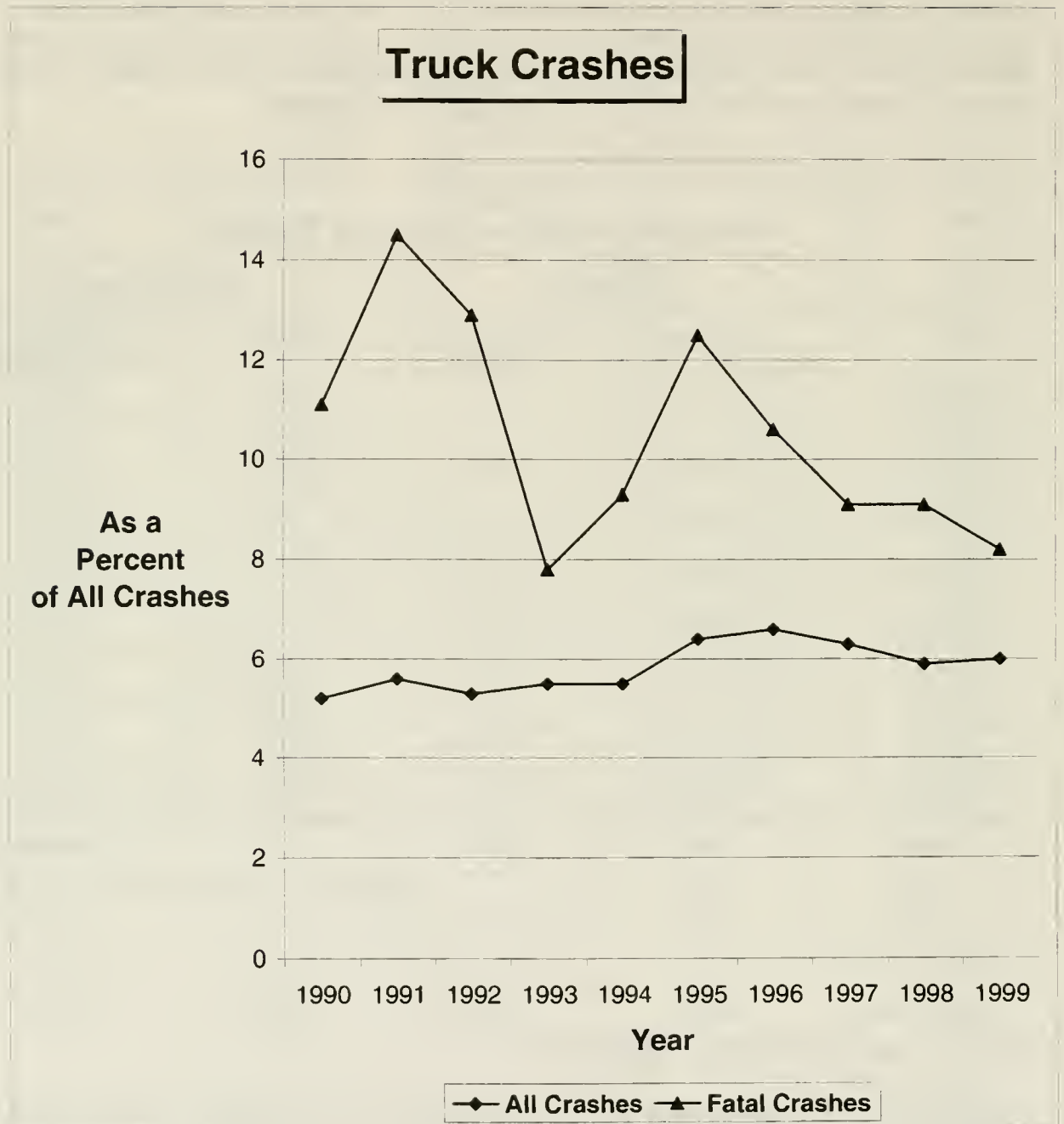
This section examines crashes involving trucks in Montana. The following table contains a ten-year history of truck crashes within the state. The number of crashes reached a high in 1996 and has decreased by 20% over the last three years. The number of fatalities resulting from crashes involving trucks has been lower during the last two years. This change will be watched closely in order to decide if there is a trend occurring here or whether this is just a non-significant variation.

Table 36 Number of Crashes Involving Trucks				
Year	Crashes		Fatal Crashes	
	Number	Percent of all Crashes	Number	Percent of all Fatal Crashes
1990	857	5.2%	21	11.1%
1991	959	5.6%	25	14.5%
1992	923	5.3%	22	12.9%
1993	1043	5.5%	13	7.8%
1994	1056	5.5%	17	9.3%
1995	1314	6.4%	27	12.5%
1996	1646	6.6%	21	10.6%
1997	1426	6.3%	24	9.1%
1998	1310	5.9%	19	9.1%
1999	1262	6.0%	16	8.2%
Chg 1 Year	-3.7%	+1.7%	-15.8%	-9.9%
Chg 5 Year	-6.5%	-2.3%	-26.9%	-2.2%

Source: TIS - Montana Department of Transportation

Figure 16 on the following page shows the number of truck crashes as a percentage of all motor vehicle crashes.

Figure 16



This table presents a breakout of trucks by trailer type. There was an especially large increase in crashes involving trucks with single and double trailers during 1996. Very icy roads were thought to be part of the cause. Speed may also have been part of the cause, since this was the first full year after the national speed limit was repealed.

**Table 37**  
**Truck Crashes by Trailer Type**

	Crashes				Fatal Crashes			
Year	No Trailer *	Single Trailer	Double Trailer	Triple Trailer	No Trailer	Single Trailer	Double Trailer	Triple Trailer
1990	314	470	67	6	5	14	2	0
1991	388	483	83	5	9	13	3	0
1992	354	476	91	2	5	10	7	0
1993	453	501	87	2	2	10	1	0
1994	415	549	92	3	4	11	2	0
1995	625	579	109	1	8	13	6	0
1996	619	864	161	2	0	12	1	0
1997	533	783	107	3	6	15	3	0
1998	517	663	129	1	8	9	2	0
1999	518	658	123	1	5	8	3	0
Chg 1 Yr	+0.2%	-0.8%	-4.7%	---	-37.5%	-11.1%	+50.0%	---
Chg 5 Yr	-4.4%	-4.3%	+2.8%	+100%	-3.8%	-33.3%	+7.2%	---

Source: TIS – Montana Department of Transportation

\* Trucks with no trailer would include single unit vehicles like delivery trucks and local UPS trucks. They could also include Tractor-Trucks that currently are not pulling a trailer.





## 10. Special Vehicle Involvement In Crashes

This Section displays data for special vehicles such as buses, ambulances, farm machinery and fire trucks. Table 38 contains data on the number of these special vehicles involved in crashes for a ten-year period.

Table 38 Special Vehicle Types in Crashes						
Year	School Bus	Bus	Ambulance	Farm Machinery	Fire Truck	Snow-mobile
1990	34	39	8	16	4	9
1991	52	42	8	25	5	4
1992	46	30	17	11	8	5
1993	58	46	9	26	5	12
1994	60	66	10	16	8	13
1995	47	57	9	19	4	9
1996	71	91	11	33	11	15
1997	73	71	14	32	12	14
1998	48	58	11	32	15	13
1999	63	60	9	16	8	12
Chg 1 Yr	+31.3%	+3.4%	-18.2%	-50.0%	-46.7%	-7.7%
Chg 5 Yr	+5.3%	-12.5%	-16.2%	-39.4%	-20.0%	-6.2%

Source: TIS – Montana Department of Transportation

School bus and bus involvement in motor vehicle crashes was higher in 1999 than the previous year but still below 1997. The involvement of farm machinery and fire trucks were much lower in 1999 than during the previous three years.

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DIVISION OF THE PHYSICAL SCIENCES  
DEPARTMENT OF CHEMISTRY

EXPERIMENTAL DATA		CALCULATED DATA	
Run	Time	Run	Time
1	10.0	1	10.0
2	20.0	2	20.0
3	30.0	3	30.0
4	40.0	4	40.0
5	50.0	5	50.0
6	60.0	6	60.0
7	70.0	7	70.0
8	80.0	8	80.0
9	90.0	9	90.0
10	100.0	10	100.0
11	110.0	11	110.0
12	120.0	12	120.0
13	130.0	13	130.0
14	140.0	14	140.0
15	150.0	15	150.0
16	160.0	16	160.0
17	170.0	17	170.0
18	180.0	18	180.0
19	190.0	19	190.0
20	200.0	20	200.0
21	210.0	21	210.0
22	220.0	22	220.0
23	230.0	23	230.0
24	240.0	24	240.0
25	250.0	25	250.0
26	260.0	26	260.0
27	270.0	27	270.0
28	280.0	28	280.0
29	290.0	29	290.0
30	300.0	30	300.0
31	310.0	31	310.0
32	320.0	32	320.0
33	330.0	33	330.0
34	340.0	34	340.0
35	350.0	35	350.0
36	360.0	36	360.0
37	370.0	37	370.0
38	380.0	38	380.0
39	390.0	39	390.0
40	400.0	40	400.0
41	410.0	41	410.0
42	420.0	42	420.0
43	430.0	43	430.0
44	440.0	44	440.0
45	450.0	45	450.0
46	460.0	46	460.0
47	470.0	47	470.0
48	480.0	48	480.0
49	490.0	49	490.0
50	500.0	50	500.0
51	510.0	51	510.0
52	520.0	52	520.0
53	530.0	53	530.0
54	540.0	54	540.0
55	550.0	55	550.0
56	560.0	56	560.0
57	570.0	57	570.0
58	580.0	58	580.0
59	590.0	59	590.0
60	600.0	60	600.0
61	610.0	61	610.0
62	620.0	62	620.0
63	630.0	63	630.0
64	640.0	64	640.0
65	650.0	65	650.0
66	660.0	66	660.0
67	670.0	67	670.0
68	680.0	68	680.0
69	690.0	69	690.0
70	700.0	70	700.0
71	710.0	71	710.0
72	720.0	72	720.0
73	730.0	73	730.0
74	740.0	74	740.0
75	750.0	75	750.0
76	760.0	76	760.0
77	770.0	77	770.0
78	780.0	78	780.0
79	790.0	79	790.0
80	800.0	80	800.0
81	810.0	81	810.0
82	820.0	82	820.0
83	830.0	83	830.0
84	840.0	84	840.0
85	850.0	85	850.0
86	860.0	86	860.0
87	870.0	87	870.0
88	880.0	88	880.0
89	890.0	89	890.0
90	900.0	90	900.0
91	910.0	91	910.0
92	920.0	92	920.0
93	930.0	93	930.0
94	940.0	94	940.0
95	950.0	95	950.0
96	960.0	96	960.0
97	970.0	97	970.0
98	980.0	98	980.0
99	990.0	99	990.0
100	1000.0	100	1000.0

## 11. Collisions with Animals or Avoidance

During the last 10 to 15 years, animal crashes and/or avoidance has steadily increased. Some of this increase is due to higher census numbers of deer and other wild animals. During a thirteen-year period, the reported number of motor vehicles that have collided with wild animals has increased from 589 to 1871. The key word in the previous sentence is 'reported', since many collisions with animals are not reported. When analyzing this increase, you must be aware that perhaps the percentage of collisions with animals being reported is changing. The lack of a numerical daytime speed limit may have had some effect on this increase.

Table 39  
**Collisions Involving Animals**

Year	Collisions With Wild Animals	Collisions With Domestic Animals	Fatal Crashes Involving Animals
1990	713	226	2
1991	746	225	3
1992	851	208	3
1993	868	212	3
1994	1203	269	1
1995	1305	287	6
1996	1363	248	1
1997	1501	239	3
1998	1575	259	2
1999	1871	296	2
Chg 1 Year	+18.8%	+14.3%	---
Chg 5 Year	+34.7%	+13.7%	-23.1%

Source: TIS – Montana Department of Transportation

The first part of the paper discusses the importance of the study and the objectives of the research. It also provides a brief overview of the literature review and the methodology used in the study.

Table 1	
Year	Value
1990	100
1991	105
1992	110
1993	115
1994	120
1995	125
1996	130
1997	135
1998	140
1999	145
2000	150
2001	155
2002	160
2003	165
2004	170
2005	175
2006	180
2007	185
2008	190
2009	195
2010	200
2011	205
2012	210
2013	215
2014	220
2015	225
2016	230
2017	235
2018	240
2019	245
2020	250

The second part of the paper discusses the results of the study and the conclusions drawn from the data. It also provides a brief overview of the future research and the implications of the study.



## 12. Railroad Crossing Safety

Motor vehicle collisions with trains are a relatively rare event, but the severity of such collisions tends to be very high. Table 40 presents a history of these collisions on public roadways in Montana for rural roads and for all roadways. The twelve crashes with trains were the lowest number since before 1985. Only one of these crashes was not at a rural location.

Table 40 Collisions with Trains						
Year	Rural			Total		
	Crashes	Fatal Crashes	Injury Crashes	Crashes	Fatal Crashes	Injury Crashes
1990	13	4	3	20	5	5
1991	14	0	4	20	0	4
1992	11	1	6	16	1	7
1993	13	5	5	21	6	9
1994	18	0	8	23	0	10
1995	11	2	4	16	3	5
1996	24	3	10	27	3	11
1997	20	0	11	28	0	16
1998	16	2	6	24	2	11
1999	11	1	4	12	1	4
Chg 1 Yr	-31.2%	-50.0%	-33.3%	-50.0%	-50.0%	-63.6%
Chg 5 Yr	-38.2%	-28.6%	-48.7%	-49.2%	-37.5%	-62.3%

Source: TIS – Montana Department of Transportation



## F. COUNTY RANKING

The following section places a ranking on the 56 counties in Montana. Each county is ranked from 1 to 56 in the following areas: Severe injury crashes (crashes with a fatality or incapacitating injury) and alcohol related crashes.

Table 41  
**County Ranking for Traffic Safety Programs**

Rank	County	Severe Crash Rank	Alcohol Crash Rank	Sum of Ranks
1	Missoula	1	2	3
1	Yellowstone	2	1	3
3	Flathead	3	3	6
4	Cascade	5	4	9
5	Lewis and Clark	4	6	10
6	Gallatin	6	5	11
7	Ravalli	7	8	15
7	Lake	8	7	15
9	Glacier	9	10	19
10	Silver Bow	11	9	20
11	Lincoln	10	11	21
12	Park	14	11	25
13	Jefferson	12	14	26
13	Big Horn	13	13	26
15	Stillwater	16	16	32
15	Carbon	15	17	32
17	Sanders	17	19	36
18	Hill	23	15	38
18	Madison	19	19	38
20	Mineral	20	21	41
20	Beaverhead	20	21	41
22	Custer	25	18	43
23	Powell	18	27	45
24	Fergus	22	24	46
25	Roosevelt	28	23	51
26	Deer Lodge	25	29	54
27	Rosebud	23	32	55
28	Valley	30	26	56
29	Blaine	25	33	58
30	Broadwater	35	24	59

Table 41 (continued)  
**County Ranking for Traffic Safety Programs**

Rank	County	Severe Crash Rank	Alcohol Crash Rank	Sum of Ranks
30	Teton	30	29	59
32	Richland	35	27	62
33	Toole	28	35	63
34	Pondera	35	29	64
35	Chouteau	30	35	65
36	Musselshell	35	33	68
37	Granite	30	41	71
37	Wheatland	30	41	71
39	Judith Basin	39	38	77
39	Sweet Grass	40	37	77
41	Sheridan	40	38	78
42	Dawson	43	38	81
42	Phillips	40	41	81
44	Meagher	43	44	87
45	Wibaux	47	44	91
45	Petroleum	45	46	91
47	Treasure	45	50	95
48	Golden Valley	51	46	97
48	McCone	51	46	97
50	Liberty	48	52	100
50	Fallon	48	52	100
50	Carter	48	52	100
53	Daniels	51	50	101
54	Powder River	56	46	102
55	Prairie	51	55	106
56	Garfield	51	56	107

Source: TIS – Montana Department of Transportation

The two ranks are summed and then those totals are ranked. This table can be used as a very general ordering for traffic safety problems by county. Some counties will have special safety problems that are not represented by the above table. Many counties may not have sufficient resources to manage an attack on their safety problems.

Cost benefit is a factor when aiding counties. If a large benefit can be gained with a small amount of money, this could override aiding a project in a higher priority county. Since there is a limited amount of funding to attack the problems, these factors may override others. Missoula and Yellowstone remained tied with the highest rankings. Park and Carbon counties moved up in the rankings. Several counties with large Native American populations are relatively high in the rankings. As populations

change, Montana is becoming more and more the big nine counties and the little 47, as Ravalli and Lake counties continue to increase in population. In the past the 'big seven' was a common way of thinking of urban Montana.

This compilation contains a large amount of varied data. There is much "noise" in data within traffic safety, since there are many variables that can affect crashes. It is difficult to reach significance because of these many factors along with the relatively small number of crashes and fatal crashes in the state. This paper should be used as a guide when looking at the traffic safety problem, along with common sense, when attempting to solve Montana's problems in traffic safety.







